

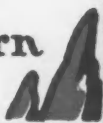
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THE CONDOR

A Magazine of Western
Ornithology



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Number 4



COOPER ORNITHOLOGICAL CLUB

THE CONDOR

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THE CONDOR

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JULY-AUGUST, 1945

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NESTING OF THE ALLEN HUMMINGBIRD

By ELMER C. ALDRICH

For several years my observations in the field were concerned largely with hummingbirds. In 1937 and 1938, attention was directed primarily to the natural history of the Allen Hummingbird (*Selasphorus sasin*). Observations were made through the spring and summer months in the San Francisco Bay region of California and especially in the hills of Oakland and Berkeley. The observations reported here were taken from a report dealing with the natural history of the species which was prepared at the Museum of Vertebrate Zoology, University of California, under the direction of the late Professor Joseph Grinnell. Dr. Jean M. Linsdale has assisted generously in the preparation of the manuscript for publication.

The content of this paper represents only a segment of the results of my field studies of the Allen Hummingbird. An effort has been made to bring together here data on the nest and on the behavior of the female during nest-building and incubation. Information on courtship and other aspects of behavior as well as development of nestlings has not yet been prepared for publication.

The processes of nest-building, incubation and rearing the young are carried out solely by the females apart from, and not necessarily near, the stations of the males. The males may form "bachelor societies" centered about choice feeding areas.

NESTING SITES

Allen Hummingbird nesting sites usually are places which provide many separate supports for the first nesting materials that are to be laid down. This species tends to build where part of the supporting structure can be incorporated into the sides of the nest rather than on a solid support as the Anna Hummingbird (*Calypte anna*) tends to do. The latter species sometimes places a nest on a limb three or four inches in diameter. Dense tangles are favorite sites for the Allen, though I have never found nests of the Anna in them. The Allen Hummingbird may build within a few inches of the ground, but I have never found an Anna nest lower than four feet from the ground. The Allen nests in less open situations than does the Anna and it is less often found close to the homes of people. Only one out of about 50 nests of the Allen Hummer was on a man-made structure, a bridge. Mailliard (Condor, 15, 1913:205), however, reported a nest on a pulley, one on a rope, and one on a wire. Anna nests are commonly found on trellises, hanging ropes, wires, porch eaves, and other artificial sites. The Allen Hummingbird nests in a variety of habitats and in many kinds of location in each habitat, but it is more restricted in selection of sites than is the Anna.

In eucalyptus trees nests are from one to fifty feet above the ground, usually near the tips of drooping, incurved branches. The nest is saddled between two fruits or on the petioles of leaves. Sometimes one petiole is incorporated into the side of the nest. The nests I have seen have been on limbs less than one inch in diameter. The normal flexibility of the support, then, causes the nests to be moved violently in the wind. At these

times the parent stays on the nest to keep the eggs or small young in it. When the small square stems of a young eucalyptus are used, they give a sturdier base for the nest and a rougher surface for attachment of the binding spider webs and other supporting materials. Occasionally a nest is placed on a horizontal leaf attached to a vertical stem which, by being incorporated into the side structure of the nest, prevents tilting. Sometimes a nest is placed between pieces of loose bark on the main trunk. The rough edges of the bark provide good anchorage for the supporting spider webs. Rarely a nest is on a curled dry leaf still attached to a drooping branch. Nests have been found on dry, rigid branches broken from the top of a tree and lodged farther down. None of the many nests found in eucalyptus trees has been within branches blooming profusely. This may be because the female avoids the multitude of hummingbirds foraging in these branches. Usually, uneasiness is displayed by the brooding female when other birds are near.

When cypress trees are near eucalyptus, the former are used for nesting. I studied two cypress groves in Oakland. In one, which was adjacent to a blossoming eucalyptus grove which provided favorable hummingbird forage, I found ten nests within a radius of fifteen yards, all in use at the same time and some within five yards of a neighboring one. The other grove was far from any eucalyptus, and I could find no hummingbird nest in it. The rough scale-like branchlets of cypress offer good attachments for the nests and often are incorporated into them. Nests in cypress trees usually are on the flat branches four to thirty feet above the ground and on one of the lower limbs which may be approached from below. At such a site there is another branch about a foot above it, which, like an awning, shades and protects the contents of the nest. Nests may be on limbs up to an inch in diameter or attached to scaly twigs only a millimeter thick. On the large limbs the nest often is saddled between two laterally attached cones. Scales of the cones afford attachments. These trees also supply much of the nesting material. Extraneous things like pappus of thistles, drifting spider webs, and bits of plant fibers collect in them. Numerous spiders spread webs in the cracks of the bark. The birds hover beside the trunks gathering these materials.

Wild blackberry and bracken fern provide sites for most of the nests that are placed in tangles and thickets. Other plants which add to the density of the tangle are oso berry, poison oak, baccharis, hazelnut, and elderberry. The tangle generally is mixed with live oaks which provide patchy shade. On blackberry vines nests usually are beneath the canopy of leaves on a solid base at the intersection of several leafless stems. On a sloping bank the nest may be on one stem only, usually on top of a leaf and its petiole and anchored on one side to the main stem. Nests attached to the ferns have attachments to the leaves as well as to the stem. Frequently the turned-up edges of fronds serve as side supports. In these tangles nests are placed from six inches to four feet above the ground, but they may be at a greater height as, for example, when held by a live oak.

On the more open bushy hillsides where coffee berry, small live oak, small elderberry, baccharis, and sticky monkey flower are characteristic plants, the last named kind is most often used. Its low growth and the sticky surfaces of the leaves make it especially suitable. The plant is not always adequate, for in one example the nest slipped around its attachment on the stem so far that one of the young birds fell out. Nests are found in this bush at open sites only where shade is present.

Allen Hummingbird nests are easily found in streamside thickets, especially where a steep bank has an abundant growth of plants like wild blackberry, nine-bark and oso berry (fig. 22). Nests are far out on overhanging branches or on exposed roots close to the bank. Nesting materials are particularly abundant, mainly the webs of spiders and

the down from willows, which constitutes the lining of most of the nests. Suitable locations are present on low banks as well as high ones. Food is generally abundant in the habitat. Road banks resemble stream banks as regards hummingbirds' needs except for the absence of streams and moisture, and this makes them less suitable. The necessary shade sometimes is furnished by the bank itself.



Fig. 22. Allen Hummingbird nest bound to petiole and branch of wild blackberry vine in a dense tangle on a steep streamside bank. The nest contained two young about six days old.

Old, weathered nests of a previous year come to form a compact pad with a secure attachment to the supporting stem. This resembles the platform built by the hummingbird at the start of each new nest and it is often used as the base for a new nest. Suitability of the site thus made available may be more important in the selection than continuity of ownership.

The observations here reported show that shade is an important element in the suitability of a nest site. Solid shadow, as that provided by a bank or a bridge, is not necessary. When shade comes from trees or tall plants projecting above a tangle, the nests in the lower bushes are in exposed situations. Twelve nests in tangles were studied. Four of these were in tangles with no shade overhead, and the nests were far within the bushes so that prolonged search was needed to find them. The eight nests under trees were in open growths of bushes, and they could be seen easily from a standing position. Equal amounts of time were spent in searching the shaded and unshaded tangles.

It is evident that a loose tangle shaded by trees is preferred over a dense, unshaded one. The reason apparently is that the bird can approach the nest easier in a loose tangle. Several times I watched a female approach its nest in a dense blackberry thicket. Always the approach was difficult because of the intervening thorny leaves and stems. The wings frequently hit the obstructions and some side-slipping and backward flying

was necessary as well as a change of course before the nest was reached. Every approach appeared as difficult as the first. This contrasted with the faster and easier approaches to a nest in a loose tangle.

Oak trees provide a patchy shade, and the movement of the sun, with alternation of light and shade, gives intermittent warmth. The eggs and young of the Allen Hummingbird are hardy and they appear not so readily injured by the hot sun as the nestlings of some passerine birds. Nevertheless, much uneasiness is shown by the young or the brooding female when cover is removed from above the nest. This presents difficulty in photography, for the young birds wiggle violently when the desired amount of light is obtained by removing the branches from overhead.

NEST CONSTRUCTION

Nests of the Allen Hummingbird in early stages of construction are seldom found. Also, it is difficult to determine when a nest is completed, for materials are added throughout the nesting. A nest found on March 9 by Howard Twining was seen when

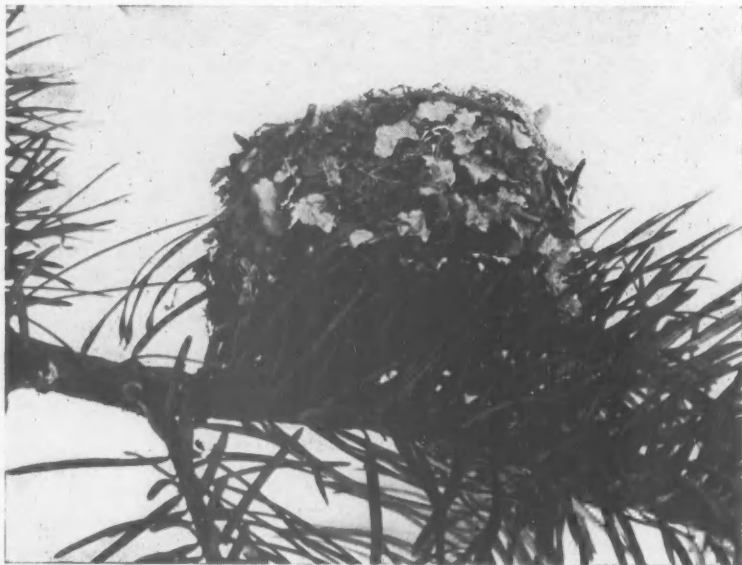


Fig. 23. Nest placed on branch of Douglas fir, six feet above ground, and shaded by a branch above. Well incubated eggs were present.

the female deposited the first material, some pappus of baccharis. The site seemed to be a poor one, and at first it was thought that the bird was gathering, rather than placing material. Thirteen days later a nest containing two eggs was found on the site. Examination of the eggs indicated that they had been laid at least two days earlier. It was thought then that this nest contained eggs eleven days after construction began.

Nests placed on old nests require shorter time to build than ones placed on a new base. On March 7, 1937, I saw a female place first material of a new nest on an old

structure of a previous year. Eight days later, on March 15, the first egg was laid. Early stages of nest building involve the making of a base from which the rest of the building is done. Apparently old nests are much sought, because in them the pad is already provided.

Trips for nesting material may extend as far as 300 yards, but my observations show that about 90 per cent of the material is obtained within 25 yards of the nest. As a rule the bird goes only as far as is necessary. On occasion trips for food and nesting material may be combined, and then items may be brought from a distance that are available close by.

In a grove of cypress trees close to blooming eucalyptus trees nests were close together and no long trips for food or nesting were observed. Long periods of watching at one nest showed that nearly all the material came from within 25 yards of the site. Occasional trips were made to a pigeon pen 40 yards away to get down feathers for the lining. Many times the bird flew 100 yards or farther to a eucalyptus, presumably to feed, but on these long trips it rarely brought back nesting material. All the nests in this area contained pappus or down from plants which I suspect was taken from spider webs that had tethered it, for none was available on plants. Females were seen to take spider webs, lichens, and mosses from a large rock 15 yards from the nests.

This cypress nesting area where materials were readily available contrasted with a location high in a canyon which necessitated long trips for food as well as materials. The nest was at the edge of a small, young, dense grove of eucalyptus surrounded by open fields and containing no flowers. The hummingbird flew repeatedly to the bottom of the canyon 300 yards away, presumably to get down from willow catkins. Various other types of material were brought up by direct flight from the streamside below. Another nest high on the side of a gulch contained willow down. The nearest willows were at least 350 yards away. Possibly the down was obtained from the air or from spider webs.

Spider webs are essential in the construction of an Allen Hummingbird nest. They are gathered from trees, faces of rocks, out of the air, or any place visible to the bird. At one place most of the webbing was obtained from up-turned cypress stumps among standing trees. Females gathering webbing were pugnacious at times and they chased one another from the coveted materials. Webs usually are taken while the hummingbird is on the wing and hovering. They are grasped between the tips of the bill and the fibers are tangled irregularly over all of the bill and sometimes on the forehead and throat. Quick backward movements pull the webs from their moorings. Sometimes a female clings woodpecker fashion and with outspread wings to the face of a rock, picking off spider webs, moss, and other materials for a nest. Both green and dry mosses are obtained, pulled while the bird is in flight.

Bits of shredded leaves and grass are used, the bird weaving in and out of a bush to pull grass fibers apart. Considerable tugging may be necessary to tear off a piece of leaf or fine bark. The pulling backward enables the bird to obtain the fiber and to shred the material. Most of the shreds thus obtained are less than a millimeter in width and they become curled so as to be more easily woven into the nest.

Down from willow and pappus from composite plants such as *baccharis* and small thistles are used abundantly in the nests. The birds in gathering down from willows make intermittent stabs and short, backward flights until they have a loose ball about half an inch in diameter in the terminal third of the bill. Usually a direct flight takes this to the nest. Downy feathers are taken from the ground, from spider webs, or from the air. Birds in areas where little undergrowth is present appear to get their down as

it floats by in the air. Females perch at the edge of a clearing and sally out for nesting material as well as for insects.

Hairs from horses and dogs are present in many nests, and several nests contained hairs from a California ground squirrel. Padding from the top of an old automobile supplied hairs for many females building in a cypress grove. A man told me that a hummingbird once tugged at hair of his head as he sat beneath a tree.

Lichens are invariably used on the outside of nests of Allen Hummingbirds. The pieces are pulled one at a time in the manner used in gathering moss. Nests close to a supply of lichens are especially well decorated with them. A nest far from a lichen supply had only three pieces on its outer wall. Possibly the cover of lichens should not be called a decoration. To the human eye it breaks up the pattern and causes the nest to blend with the surrounding foliage. It is difficult to see the nests in tangles because of the lichens scattered over the exterior. Even without lichens the nest simulates its surroundings because of its concealingly green outer layer.

In about nine-tenths of the nests moss makes up the largest part of the outer layer, thus giving the outside of the nest a greenish color which is characteristic of this species. Nests without moss are far from moist places where moss occurs. When moss is not used, as in some nests in eucalyptus groves, the outer layer is usually composed of bits of shredded bark and dried small blades of grass, thus giving the nest a dull grayish appearance, rather than the mossy-green color. Occasionally, however, a nest near a mossy stream has little moss in it.

The inner layer of a nest of an Allen Hummingbird comprises the greater bulk and is always made of white downy material. This was true of the 65 nests I have examined from localities from Humboldt County to Ventura County, California. In all of these the down was from willow or from some composite plants. The outer layer is thin and composed of stiffer material than that in the inner layer. It and the whole nest is held in place by spider web.

The first material deposited at a nest site is usually some form of down. Immediately trips are made to obtain spider webs and the bit of down is securely bound. Unless there is a convenient perching place at the site, the first materials are deposited while the bird is hovering. Spider webs are used abundantly in early stages, and they provide a sticky surface on which to place the materials. They are scraped off the bill of the hovering bird by short forward and backward flights and they are adjusted with the tip of the bill. Sometimes coarser materials such as grass, moss, and bits of leaves are incorporated into the basal structure of the nest. If the site is on fine twigs, as in a cypress, the twigs are bound together and the network furnishes a base. After a small pad is made, nearly all the building is done from a sitting position. As the rim rises from the edges, the two layers become distinct. After that few spider webs are used in the interior, but they are used to bind the outer layer. The tuft of downy material brought in may be half an inch in diameter, and if placed on the floor it is tamped with an almost vibratory motion of the feet. The developing cavity is rounded and made a suitable size by the compacting action of the pivoting female accompanied by the foot motion and outward thrusts of the depressed bends of the wings. The rim is made solid by using the bill in a forceps-like manner to force bits of grass or leaves through the wall and into the base of the nest. The protruding ends of materials are pushed into the sides and rim by frequent probing. Most of the elongated material of the outer layer is placed so that it follows the curvature of the nest. Preparation of the material, such as shredding of the fibers or breaking off their unwanted ends, is done away from the nest when they are collected.

From the sitting position the bird removes cobwebs from the bill by pointing it downward over the outside of the nest and scraping them off with an upward motion of the head and neck. This motion also aids in compacting the nest. Sometimes the bird removes the webbing while pivoting. Often the female moves her bill back and forth along the rim and outer surface of the nest, possibly to adjust spiderwebs too small for the observer to see. Hair is placed in the lining along with the downy material and around the rim. Feathers may be added after the nest is nearly completed. These are placed almost invariably on the inner border of the rim where they come into contact with the body of the bird. I found no nest containing more than three feathers.

Lichens are placed with the light green side out and are bound to the outside of the nest with spider webs. Although the birds might be thought to recognize the protective advantage in having the green side out, they more likely place the lichens in this fashion because the rougher surface on the underside makes them more easily secured to the nest.

Nest building continues until the young leave. Some females laid eggs when the nest was a mere platform and the eggs could be easily rolled out. Others laid eggs after the



Fig. 24. Nest precariously attached to curled tips of bracken fern. A heavy rain caused the nest to stretch. Later both young fell from the nest.

nests were almost completed and were decorated with lichens. In many instances lichens were added after the eggs had been laid and the nest had reached final proportions. The birds bring additional downy lining and spider webs throughout incubation. During incubation the lining becomes matted, and this, coupled with stretching of the entire nest, makes room for the developing young. They further stretch the nest. In one instance feathers, spider webs, and lichens were added after one young had left the nest.

The female is alert to keep the nest in order, and if the wind is blowing, she may struggle for a good part of a day to keep a feather securely attached. Rain tends to keep the mosses and lichens green and fresh, but sometimes it causes a nest to sag badly

(fig. 24). The female then adds to the lower side and makes further attachments of supporting spider webs. Sometimes she does not succeed and the young fall out.

EGGS

This species, like other hummingbirds, almost invariably lays two eggs in each nest. I have seen nests containing one egg, but in each instance it was known that one egg had been broken. A set of two eggs (Mus. Vert. Zool. no. 1408) collected by L. P. Bolander in Santa Cruz County, is accompanied by the notation, "Set of 3, one egg missing." The eggs usually are laid on alternate rather than on successive days, although Orr (Condor, 41, 1939:17) has reported one example when laying was on successive days. I found one instance where the layings were separated by two days.

The eggs are large in comparison to the size of the bird. Two fresh eggs weighed 5 and 6 grains, or .323 and .388 grams. They appeared noticeably different in size. The first-laid egg of a set weighed 7.5 grains when fresh. An egg advanced in incubation weighed 6.7 grains. Weights indicated on tags of specimens of adult females averaged about three grams or 46.29 grains. This is about eight times the weight of an egg.

Eggs of hummingbirds are elliptical-ovate and appear nearly the same shape at both ends. Some nests of the Allen Hummingbird contain eggs that are relatively larger than others. According to Dawson (Birds of California, 1924:924) the average dimensions of 24 eggs from Santa Barbara were 11.9 and 7.9 mm.; average of 16 eggs from Humboldt County, 12.2 and 7.9 mm.

Egg color in the Allen Hummer is pure white without gloss. Because of the opaqueness of the shell, there is little of the pinkish tinge that might be expected. This may be detected in a fresh egg by holding it to the light. When incubation is advanced, the eggs become discolored and more opaque, then appearing dirty white.

ACTIVITIES DURING INCUBATION

The incubation period at nests of Allen Hummingbirds I watched varied from 17 to 22 days. The higher figure is greater than any record for a hummingbird that I have found. Variability in the published records may result from differences in opinion as to when incubation begins. I observed that in the Allen Hummingbird it begins with laying of the first egg. Variability also may result because some females do not attend the nest as closely as others. According to Dawson (*op. cit.*:938), counting from deposition of the second egg, incubation lasts 12 days.

For two or three days prior to laying of the first egg the female is busy building, but she may brood for periods nearly as long as during incubation. Incubation begins some time after laying of the first egg. Until the second egg is laid, incubation is less intense than afterwards. Although the interval between layings is nearly two days, the interval between hatchings is nearly a day shorter. Incubation reaches its greatest intensity about three days after the second egg is laid, and remains constant until hatching. Length of periods on the nest is highly variable. Periods off the nest, however, are fairly constant. Only occasionally does a female stay away for a period exceeding seven minutes.

The accompanying table shows typical incubation activities. It represents the 7 hours and 32 minutes from 10:08 a.m. to 5:40 p.m. on one day. The female was on the nest 6 hours and 14 minutes, or 82.8 per cent of the time. Periods on the nest are longer late in the day than in the morning. In normal daylight hours longer periods are spent on the nest when the temperature is low. Shortest periods come between 11 a.m. and 1:30 p.m. when temperatures are highest. Departures of incubating females usually

ceased when the light reflected from a green background and measured by a Western Exposure Meter, Model 650, fell below two foot candles. This was not influenced by temperature.

Light in foot candles	Attentiveness of an incubating female			
	Left nest	Returned to nest	Minutes on	Minutes off
		10:08		
	10:12	10:17	4	5
	10:46	10:51	29	5
	11:02	11:06	11	4
	11:21	11:23	19	2
	11:36½	11:37	13½	½
	11:38	11:40	1	2
	11:51½	11:54	11½	2½
	12:06	12:08	12	2
	12:11	12:12	3	1
	12:39	12:43	27	4
	12:54	1:01	11	7
	1:04	1:05	3	1
	1:19	1:22	14	3
	1:44½	1:46	22½	1½
14	2:28	2:31	42	3
13	3:10	3:17	39¼	6¼
10	3:30	3:56	13	26
5	4:35	4:36¾	39	1¾
2.5	5:06¼	5:11	30¼	4½

Females with nests in open situations make rapid approaches to the nest, possible because there are few obstructions. At nests situated at the edge of a tangle, the females usually approach through the tangle and they always do this if a person is near the nest. The return is unobtrusive as the bird weaves through the underbrush, and sometimes perches for a minute or two several times before lighting on the nest. Nests in open eucalyptus or cypress trees are approached more directly than those in dense brush. The bird usually perches ten or twenty feet away and then occupies several perches, each one closer, before the final flight is made to the nest. These nests also are approached by the bird flying to a point below the nest, then hesitating, and rising almost vertically and slipping onto it. The *tick* note may be given repeatedly in the short perching periods near the nest.

The female usually alights directly on the eggs without standing on the nest rim. Contact with the eggs is made by gradually lowering the body into the cup with the tail partly spread over the rim. This takes only a part of a second. Occasionally the bird alights on the rim and adjusts eggs or nest. The bird is more likely to stand on the rim on warm days than on cold ones. Sometimes a bird approaches a nest, hovers beside it, and makes adjustments of nest or eggs.

One bird I watched landed on its nest and breathed for three minutes at a rate of 234 times a minute or greater than twice the normal rate. Breathing then was reduced to the normal. After alighting on a nest the female may hold its bill open about an eighth of an inch to facilitate breathing.

Manner of leaving the nest is fairly constant at all stages of incubation or from any type of site. Usually restlessness is shown by pivoting in the nest or moving the head. Departure is so rapid as to be difficult to observe. The bird usually leaves in the direction it is facing and then may circle on a radius of about five feet about the nest before heading straight away. She rises only enough to clear the edge of the nest. Sometimes a brooding bird snaps at a passing insect or rises a few feet from the nest to catch one.

The nest cavity is too small to allow the wings below the rim, and they may be spread easily in departure.

One nest, within a few inches of a bank and in a dense tangle, had but one avenue for departure. The bird usually pivoted on the nest after alighting so as to be in position to leave readily. If she left before pivoting, she would rise vertically about an inch off the eggs, fly backwards about six inches to reach the open, then about-face and fly away.

When a person is conspicuously present, actions of a nesting hummingbird are altered considerably. She does not readily approach the nest and may not return until the intruder leaves. This wariness seems to increase as incubation progresses. Continual ob-



Fig. 25. Female Allen Hummingbird in normal incubation position when temperature not excessive.

servation at a nest seems to make the bird more wary. At nests beside well-used trails, birds flushed from eggs more readily than at more secluded sites. When driven from a nest, the bird usually does not fly far, but makes jerky flights for perhaps 20 feet, and pauses to hover many times. There is then much vocal noise, the *tick* notes being rapid and loud. The bird may retire to a perch and utter the notes in rapid succession, accompanying them with jerks of the tail. Often a female will perch behind an observer at a nest, possibly to attract him away from it.

Nesting Allen Hummingbirds are more wary than Anna Hummingbirds, and I have never been able to touch one on the nest as I have frequently done with other kinds. In one instance I approached to within six inches of an incubating bird before it flushed. A returning, frightened but anxious female may do much weaving about in the shrubbery, then light on the nest, only to leave and repeat the weaving flight. When finally settled, it is wary, and will flush again at the slightest movement of the observer.

Usually an incubating Allen Hummingbird will tolerate the close presence of other birds near the nest. Once a female chased away another female of the same species. It flew toward the intruder, hovered six inches in front of it, and chased it for about five feet.

Turning of the eggs usually is by movement of the feet while the bird is sitting. After alighting on the nest, the female pivots and seems to move the feet rapidly up and down. Several eggs, marked with ink, were turned in the pivoting so as to be side by side and



Fig. 26. Two views of an incubating female reacting to bright mirror-reflected sunlight.

parallel with the body of the bird. The eggs are also turned by foot movement without pivoting. The sitting female often turns the eggs with the bill. The body is raised to a nearly vertical position by pressing the feet on the nest wall, the neck is doubled, and the eggs are shifted by probing with the bill. After this the bird usually settles on the eggs. Females were seen to turn eggs for several seconds from a standing position and then sit on them, using their wings for the change of position. Only occasionally did a female turn eggs while on the wing. Then the bird hovered beside the nest in nearly horizontal position and rolled the eggs over by probing under them with the bill.

Position of the hummingbird on a nest is modified by temperature and light (fig. 25). On cold days the bird sits close with the bend of the wing in the nest and most of the exposed feathers ruffled. The head is brought close to the body, making the neck appear short. On warm days the tail is spread and held vertically. On hot days the bird lifts its body partly off the eggs by standing on the floor of the nest and leaning against the

tail base on the rim. The bill opens as the rate of breathing increases. In extreme heat the bird spreads the outer tail feathers to make a right angle with the main axis of the tail. The wings are lowered and the tail spread over them.

Responses of an incubating bird to light were tested with a mirror (fig. 26). Light was directed at a bird on a nest in shade. No matter what the direction of the light shaft, the bird turned so its back would be toward it. The tail would be opened gradually to make an angle of about 100 degrees. This required about five seconds, but when the light persisted for half a minute the angle would increase to 180 degrees. The central rectrices were separated from the others, but they spread very little.

During incubation the female becomes less responsive to courtship of the males. The *zeet* note is given less often in response to notes or dives of a male. On several occasions a male performed arcs and a power dive over an incubating female. Once the female left the nest unnoticed by the male and the performance continued. Females nesting in open situations are more likely thus to be "preyed upon" by males. Some nests in open situations are not disturbed by males because of scarcity of food for them. Females with nests close to an abundant food supply are bothered considerably by males. Those in dense tangles in oak groves are bothered least. Females have been seen to fly 75 yards or farther from a nest and there feed with males, but usually they stay low under cover and feed within 25 yards of the nest.

SUMMARY

Nests of the Allen Hummingbird are commonly built in dense, at least partially shaded tangles where several separate supports are available and lend themselves to incorporation in the nest structure.

In the San Francisco Bay region, eucalyptus and cypress trees, oaks, and shrubs and vines of streamside thickets provide suitable nesting sites. Nests may be placed one to 50 feet above the ground.

In about nine-tenths of all the nests, moss makes up most of the outer layer. Willow down and pappus from composite seeds are common lining materials. Spider webs are essential in nest construction, holding the layers as well as the whole nest in place. Other nest materials used are lichens, feathers, shredded leaves, grass fibers, and hair. About 90 per cent of the material is obtained within 25 yards of the nest.

Nest-building may occupy eight to eleven days before the eggs are laid. It continues until the young leave. Eggs may be laid when the nest is a mere platform.

Two eggs constitute a clutch almost invariably. Eggs are usually laid on alternate days. Incubation begins with the laying of the first egg and lasts from 17 to 22 days.

Position of the incubating female on the nest is modified by temperature. The bird's back is directed toward the source of light.

Museum of Vertebrate Zoology, Berkeley, California, February 1, 1945.

BIRDS OF THE KETTLEMAN HILLS AREA, CALIFORNIA

By IDA DeMAY WILSON

It is always interesting to find out what sort of wild creatures manage to live in unfavorable regions which have little water or vegetation to make them habitable. Such a region is the southwestern part of the San Joaquin Valley in California. Here, at about the half-way point on a straight line between Los Angeles and San Francisco, the Kettleman Hills rise out of the dry, barren-looking flats. They extend northwestward from Kern County, through Kings County, into Fresno County, on the eastern edge of the Coast Range. The Kreyenhagen Hills and the Diablo Range, less than five miles away to the west across the Kettleman Plain, support more vegetation than the Kettleman Hills and provide suitable habitats for more kinds of animals. So also does the Coalinga area to the northwest (Arnold, Condor, 39, 1937:31-35), about seventeen miles from the town of Avenal, which is situated on the Kettleman Plain just west of the north dome of the Kettleman Hills. The canals and low farm lands around Tulare Lake, about five miles east of the Hills, attract a wide variety of ducks, herons, and shore birds, but few of these stray to the Kettleman Hills.

The highest point in the Kettleman Hills rises about 900 feet above the edge of the San Joaquin Valley and about 600 feet above the Kettleman Plain. It has an altitude of 1366 feet (Woodring, Stewart, and Richards, U. S. Dept. Int., Geol. Surv. Prof. Paper 195, 1940:1-170), and Avenal is about 800 feet above sea level.

In this area the summers are very dry and hot, with maximum temperatures averaging around 100 degrees in July and August. The winters are mild, with light rainfall. Occasionally in winter the Hills are blanketed by the ground fogs of the San Joaquin Valley. For seven months of the year they are parched and brown, covered mainly by brome grasses, filaree, wild oats, bur clover, and scattered clumps of sagebrush which grows best in the arroyos and on the north-facing slopes. After the winter rains begin, the short annuals mature rapidly, covering the Hills and the flats with green. Thousands of wildflowers lend color to the landscape in March and April, but they soon produce their seeds and die. There are no native trees in the Kettleman Hills, but a few kinds such as cottonwoods and tamarisks have been planted around the houses and gasoline plants. These now provide suitable habitats for many birds which otherwise would not stay here at all.

Several years ago a game refuge was established in the north dome of the Kettleman Hills to provide a natural area where quail and other game birds might be raised. Incidentally it also serves to protect the property and employees of the oil companies. The mammals most often seen in the refuge are ground squirrels, cottontails, and jack rabbits. We have also seen badgers, kit foxes, coyotes, bobcats, antelope ground squirrels, pocket gophers, white-footed mice, and kangaroo rats. No deer are found here, although they live in the Kreyenhagen Hills just across the Kettleman Plain.

Since the summer of 1942 I have recorded in my field notes occasional observations on the birds of the Kettleman Hills area, and throughout the year 1944 these were kept as a daily census. In this work Mr. George A. Wilson has been a constant source of help and encouragement.

The area covered by this survey includes the north and middle domes of the Kettleman Hills, the town of Avenal and adjacent parts of Kettleman Plain, the Polvadero Gap, the eastern side of the Guajarral Hills, and the flats along the road between Avenal

and Huron and from there westward along the Coalinga-Hanford Road to the eastern side of Anticline Ridge (see Woodring, Stewart, and Richards, *loc. cit.*).

Cathartes aura. Turkey Vulture. Common summer visitant. Earliest record, March 28, 1944; latest, September 15, 1944. This is one of the few birds which is seen here more often in the summer than in any other season.

Accipiter cooperii. Cooper Hawk. Seen here occasionally in November, December, and January in 1943 and 1944. Also recorded on April 4 and on August 16, 1944.

Buteo jamaicensis. Red-tailed Hawk. Common winter visitant. Earliest record, September 9, 1944; latest, April 10, 1944.

Buteo lineatus. Red-shouldered Hawk. Seen on December 3, 1943, January 13, 1944, and April 14, 1944, over the Kettleman Hills.

Buteo regalis. Ferruginous Rough-legged Hawk. Two seen on the Kettleman Plain south of Avenal on November 8, 1942, and one there on January 1, 1945. On the flats along the Coalinga-Hanford Road we saw one on April 18, 1944, and several more during December, January, and February in 1944 and 1945.

Aquila chrysaetos. Golden Eagle. One seen on the flats near Huron on May 17, and two near the Gujarral Hills on December 7, 1944. On December 12, 1944, one was soaring over the Kettleman Hills, and on February 19, 1945, we saw a large one feeding on the carcass of a sheep near the north end of the Kettleman Hills. There were Golden Eagles in Tar Canyon (in the Kreyenhagen Hills) on April 23 and December 17, 1944.

Circus cyaneus. Marsh Hawk. Fairly common resident. Seen occasionally throughout the year, least often during the summer. More common near Tulare Lake.

Falco mexicanus. Prairie Falcon. Recorded in this area during November, December, and January in 1942, 1943, 1944, and 1945. Earliest record, November 7, 1943; latest, January 6, 1944.

Falco peregrinus. Duck Hawk. On January 5, 1944, there was one near Huron, and on November 16, 1944, we saw another falcon, probably of this species, on section 11P.

Falco sparverius. Sparrow Hawk. Fairly common resident. Recorded occasionally during the spring and summer, and fairly frequently during the fall and winter.

Alectoris graeca. Chukar Partridge. This is one of the two species of game birds which the local sportsmen's clubs have been trying to establish in the Kettleman Hills Game Refuge. They were raised in pens for two years, then released a few at a time, starting about 1940. In the spring of 1943 the first wild broods were seen. We recorded Chukars here in 1944 between April 10 and May 5, and on July 20 (an adult with six young), August 28, and October 31. A few more were reported in February, 1945.

Lophortyx californica. California Quail. Common resident. On August 21, 1944, we saw a pair with about ten young on section 11P. We also saw a female with young in Tar Canyon (in the Kreyenhagen Hills) on June 28, 1943.

Phasianus colchicus. Ring-necked Pheasant. This is the other game bird which the local sportsmen's clubs have been trying to establish here, but it does not seem to be doing very well. We saw pheasants in the Hills in 1944 on May 30 and occasionally between August 29 and September 21.

Oxyechus vociferus. Killdeer. Seen in the Kettleman Hills on May 22, May 29, June 6, and October 28, 1944, and in Avenal on February 11, 1945. They may be seen more often on the marshy lowlands near Tulare Lake.

Zenaidura macroura. Mourning Dove. Common resident. Doves are seen least often during the winter, when they gather in large flocks.

Geococcyx californianus. California Road-runner. Fairly common resident. Seen occasionally all the year around. In the spring of 1944 we watched a pair nesting and rearing their young in a clump of bushes on section 33J. Nest-building was first noticed on March 24 and continued until March 30. A bird was seen on the nest several times between April 3 and 30. On May 2 we saw four young in the nest, fully feathered but with short tails. They left the nest on May 7, 1944.

Tyto alba. Barn Owl. Recorded on January 20, July 4, and July 5, 1944, in the hills of the north dome. These owls probably live in the Kreyenhagen Hills and come across the Kettleman Plain to hunt here at night.

Speotyto cunicularia. Burrowing Owl. Fairly common resident. Seen occasionally during the year in the Kettleman Hills or on the flats. On June 7, 1944, there were four half-grown owls standing in a row by a burrow near Huron.

Chordeiles acutipennis. Trilling Nighthawk. On the evenings of April 29 and June 29, 1944, we saw one flying between Avenal and the western edge of the Hills.

Aëroautes saxatalis. White-throated Swift. One record, on April 8, 1944, of two swifts flying north against the wind over section 3P.

Calypte anna. Anna Hummingbird. The hummingbirds recorded between August 19 and October 28, 1944, and on January 20, 1945, were evidently of this species.

Colaptes cafer. Red-shafted Flicker. Earliest record, September 30, 1944. Seen occasionally during October, November, and December, 1944. Latest record in this area, January 6, 1945. In Tar Canyon we saw flickers on January 2 and on December 17, 1944.

Tyrannus verticalis. Western Kingbird. Common summer resident. First recorded in the spring on March 30, 1944; seen almost every day thereafter in this area until July 21, 1944 (latest record). We watched a pair building a nest on a valve wheel in the gasoline plant on section 33J on May 8, 1944. There was one egg in the nest on May 16 and three eggs on May 18. On June 7 the parent birds were feeding the young in the nest, and on June 20 the deserted nest contained two dead fledglings. Another pair of kingbirds appeared to be nesting in some trees near a house on section 4P. In previous years kingbirds have nested in the gasoline plant on section 11P.

Myiarchus cinerascens. Ash-throated Flycatcher. Seen during the summer of 1943, and occasionally in 1944 between May 9 and November 2, on the Hills or in Avenal.

Sayornis nigricans. Black Phoebe. One seen on March 29, 1944, on section 11P and one on July 16, 1944, in our yard in Avenal. One was seen in Tar Canyon on December 3, 1944, and several were seen near Tulare Lake on March 4, 1945.

Sayornis saya. Say Phoebe. Unlike most of the flycatchers, these birds were not seen during the hottest part of the summer, but remained here the rest of the year. The first record in the fall was on September 25, 1944, and the last in early summer was on June 29, 1944. They were seen most often in the fall.

Myiochanes richardsonii. Wood Pewee. Seen early in the summer of 1943. In 1944 recorded between May 20 and June 15, on July 24, and occasionally between September 19 and October 8.

Otocoris alpestris. Horned Lark. Seen in large numbers on the flats except during the summer. Apparently only a few stay here then. Occasionally seen in the Hills.

Hirundo rustica. Barn Swallow. We saw a few in this area on April 17 and May 9, 1944. Large numbers were seen along the canals north of Tulare Lake on April 4 and June 6, 1943.

Petrochelidon albifrons. Cliff Swallow. Seen on March 27, April 29, May 17, August 15, August 27, and November 16, 1944, in the Kettleman Hills or in the trees in our yard. They were seen in very large numbers on April 4 and June 6, 1943, and in small numbers on March 4, 1945, along the canals north of Tulare Lake. There were three in Tar Canyon on April 23, 1944.

Corvus corax. Holarctic Raven. Abundant resident. Seen almost every day throughout the year. They are especially numerous on the flats in the fall and early winter. We have found deserted ravens' nests in oil derricks and in a hollow on the side of a cliff, but we have not yet seen them nesting.

Sitta canadensis. Red-breasted Nuthatch. On October 26, 1942, one was working around the trunk of a cottonwood tree near a building on section 11P. Our next record was on October 13, 1944, when there was one in an umbrella tree in our yard, searching over the bark.

Troglodytes aedon. House Wren. Late in the summer of 1943 we saw a House Wren on several occasions in a gasoline plant on section 3P. It seemed quite at home among the pipe lines, pumps, and other equipment.

Troglodytes troglodytes. Winter Wren. On October 5, 1944, one of these wrens alighted on a vertical pipe outside the window of a building on section 11P. It looked in for a moment, then flew away.

Salpinctes obsoletus. Rock Wren. Seen during 1944 on March 17 and several times between May 15 and July 13 near holes in cut banks beside the road on sections 3P and 35J. On May 30 there were two on section 35J, one of which could not fly very well and seemed to be immature. The other was herding it across the road. On December 6, 1944, we watched one for several minutes while it explored the holes in a sandstone outcrop on section 11P. Rock Wrens were seen again on section 3P on January 12, February 16, and March 7, 1945. We also saw one in Tar Canyon on December 12, 1943, digging in the ground with its bill.

Mimus polyglottos. Mockingbird. Fairly common resident. Seen in small numbers throughout the year. They are most abundant in the spring and fall.

Turdus migratorius. Robin. Earliest record, December 5, 1943, when there was a storm in the mountains. In 1944 Robins were seen occasionally between February 22 and March 30 on the lawns in Avenal. Next recorded on March 6, 1945, when two were seen near some houses on section 3P.

Hylocichla guttata. Hermit Thrush. Seen on section 11P on December 13, and in Avenal on December 14 and 20, 1944. Seen again in our yard on February 13, 1945.

Hylocichla ustulata. Swainson Thrush. Seen occasionally in our yard or in the Hills between May 22 and 27, October 8 and 16, and November 4 and 6, 1944. On the morning of October 16 we found a dead Swainson Thrush on the steps of a building on section 11P.

Sialia currucoides. Mountain Bluebird. First seen on the flats northwest of Avenal on November 7, 1943. Also recorded in this area in December, January, and February, 1944-45. Latest record, March 1, 1945. Large flocks were seen in Tar Canyon in December and January, 1944.

Poliophtila caerulea. Blue-gray Gnatcatcher. Seen in Avenal or in the Hills during 1944 between January 13 and 27, and on March 20, May 10, October 4, and December 13. We also saw one in Tar Canyon on April 23, 1944.

Regulus satrapa. Golden-crowned Kinglet. In the afternoon of November 3 and the morning of November 4, 1944, there was a female Golden-crowned Kinglet in our yard in Avenal. We watched for some time while it foraged in the trees and shrubs and on the lawn.

Regulus calendula. Ruby-crowned Kinglet. Fairly common winter visitant. Comes here at the end of October or early in November. First seen in 1942 on November 5, in 1943 during the first week in November, and in 1944 on October 28. Seen fairly often in the fall, but only occasionally in winter. Latest record, March 31, 1944.

Anthus spinoletta. Water Pipit. Only one record, on December 5, 1943, when there were storms in the mountains. At about ten o'clock in the morning we watched one walking about on our neighbor's lawn, bobbing its tail up and down as it looked for food in the grass.

Bombycilla cedrorum. Cedar Waxwing. Flocks seen occasionally in the trees in Avenal between January 23 and April 16, 1944.

Lanius ludovicianus. Loggerhead Shrike. Abundant resident. Seen almost every day throughout the year in this area. During June, 1944, a pair of shrikes came into our yard quite often. They seemed to have a nest in a eucalyptus tree near by, and on June 28, 1944, there was a young one with them on a power line near our house.

Dendroica aestiva. Yellow Warbler. Seen on April 30, September 28, and October 1, 1944, in our yard. In Tar Canyon we saw one on April 23, 1944.

Dendroica auduboni. Audubon Warbler. Common winter visitant. First recorded in the fall on September 24, 1944. Seen almost every day during the fall, but less often during the winter. Latest record, March 30, 1944.

Oporornis tolmiei. Tolmie Warbler. On May 23, 1944, there was one female in the cottonwood tree near a building on section 11P. Early in the summer of 1943 we saw a warbler, probably of this species, in the pepper tree in our yard.

Wilsonia pusilla. Pileolated Warbler. Early in the summer of 1943 there was one in our pepper tree. During 1944 we saw Pileolated Warblers on May 6, May 20, August 16, August 26, September 18, and October 27 in our yard or in the Hills.

Passer domesticus. House Sparrow. Abundant resident. Seen almost every day in spring and fall, and fairly often in winter and summer. On March 16, 1944, a pair of them was building a nest in the gasoline plant on section 3P. On March 20, 1944, a pair was looking for a nesting site in our back yard, where they had nested in 1943.

Sturnella neglecta. Western Meadowlark. Common resident. Seen almost every day except during the summer, when only a few remain here. Most abundant in the spring and fall.

Agelaius phoeniceus. Red-winged Blackbird. Seen between April 5 and June 5, 1944, in the irrigated grain fields near Huron. Large numbers of these blackbirds are found along the canals at the north end of Tulare Lake.

Agelaius tricolor. Tricolored Blackbird. On March 4, 1945, we saw a large flock of these blackbirds on some power lines where Skyline Road leaves Avenal and enters the Kettleman Hills. There were several flocks of them along the canals at the north end of Tulare Lake on the same day.

Icterus bullockii. Bullock Oriole. First seen in our yard on April 8, 1944, when there were storms in the mountains. In the group were five males and one bird that might have been a female or a first-year male. Early in the summer of 1943, and between April 29 and July 14, 1944, these orioles were seen and heard occasionally in Avenal or in the Hills. A pair was seen in Tar Canyon on April 23, 1944.

Euphagus cyanocephalus. Brewer Blackbird. Flocks seen occasionally during fall, winter, and spring, but not between July 10 and September 27, 1944, in this area.

Hedymeles melanocephalus. Black-headed Grosbeak. When the figs were ripe in the summer of 1943, we saw a female grosbeak fly down into the fig tree in our back yard. On December 12, 1943, a male was seen in the Kreyenhagen Hills.

Carpodacus purpureus. Purple Finch. On January 5, 1944, there was a flock on the flats near Huron. On January 30, 1944, we saw quite a number in the bushes on the middle dome of the Kettleman Hills.

Carpodacus mexicanus. House Finch. Abundant resident. Seen almost every day during the year, perhaps least often in the summer. On March 20 a pair was looking for a nesting site on section 3P, and on March 21, 1944, others were looking under the eaves of a building on section 11P, where they had nested in previous years. On March 24, 1944, we found a nest in one of the garages on section 11P.

On April 3 the female was on the nest; by April 11 the eggs had hatched; and by April 24 the young had left the nest, but there was still one egg in it. Another pair was seen building a nest on April 5, 1944, on section 33J.

Spinus psaltria. Arkansas Goldfinch. Common winter visitant. Seen almost every day from September to April. Earliest record, August 29, 1944; latest, May 22, 1944.

Passerculus sandwichensis. Savannah Sparrow. On October 2, 1944, we saw one with an injured wing hop into the weeds on a hillside on section 11P.

Ammodramus savannarum. Grasshopper Sparrow. On June 22, 1944, one was singing on a power line on section 11P.

Chondestes grammacus. Lark Sparrow. Seen occasionally during fall, winter, and spring, but not between June 16 and September 28, 1944. Several were heard singing in our trees during February, 1945.

Junco oreganus. Oregon Junco. Seen in our yard on November 14, 1943, and occasionally between December 2 and 31, 1943. Next recorded in Avenal on October 13, 1944, and on section 11P on October 24, 1944. We also saw them in Tar Canyon on January 2 and December 17, 1944.

Zonotrichia leucophrys. White-crowned Sparrow. Abundant winter visitant. Earliest record, October 11, 1944, on section 11P. Seen almost every day during the fall, winter, and spring. Last recorded in Avenal on April 24, 1944, but one was seen in the Polvadero Gap on May 17, 1944.

Melospiza melodia. Song Sparrow. One seen on October 28, 1944, in the weeds and cattails below the water tank behind the Avenal High School. Some of the small sparrows frequently seen along the irrigation ditches beside the road to Huron may have been of this species.

SUMMARY

Uninviting as the Kettleman Hills may seem at first, they are not devoid of birds which live there the year around. Almost any day one may expect to see a few Ravens, Loggerhead Shrikes, California Quail, Mourning Doves, House Sparrows, Western Meadowlarks, and House Finches. Occasionally one may note Sparrow Hawks, Marsh Hawks, California Road-runners, Burrowing Owls, and Mockingbirds. Near the Hills large flocks of Horned Larks may be seen almost any time except during the summer, when just a few remain there. Only the hardiest of the residents stay in this area in undiminished numbers during July and August. Fall brings the return of the Ruby-crowned Kinglets, Audubon Warblers, Arkansas Goldfinches, and White-crowned Sparrows. In the spring when these birds are leaving, the Western Kingbirds come here to nest and raise their young before they too leave for the summer. Spring and fall are the best seasons for bird-watching, because both summer and winter visitants and some migrants may be seen then in addition to the residents.

Of the 66 species recorded with certainty, 18 may be classed as residents the year around; besides these 26 were seen in spring, 14 in summer, 30 in fall, and 24 in winter.

Avenal, California, March 8, 1945.

THE SYSTEMATIC POSITION OF THE MURRELET GENUS ENDOMYCHURA

By ROBERT W. STORER

While one must admit that our most up-to-date concepts of the higher taxonomic categories make a reduction in the number of bird genera desirable, it is to be regretted that the current trend toward "lumping" should be accelerated to the point where taxonomic changes are made without at least a careful examination of skeletons of the forms involved. This practice not only might lead one to suspect systematists of attempting to be fashionable, but it also causes needless complications in the literature. The American Ornithologists' Union Check-list Committee's treatment of the murrelet genus *Endomychura* might be cited as an unfortunate example of this trend.

The Committee has voted (1944:449) to include *Endomychura* in the genus *Brachyramphus* and cites Peters (1934) as its authority for so doing. Peters in turn gives no reference or reason for his decision and hence one must look to the birds for an explanation for this change.

A casual examination of skins of the three murrelet genera reveals three genera of two closely related species each. All the forms are about the same size, and all have closely similar winter plumages. A further look reveals that *Synthliboramphus* has a deeper bill, which is light-colored in life, and elongated head feathers and a black throat in the breeding plumage. *Brachyramphus* on the other hand has a distinct, barred summer plumage and shorter tarsometatarsi. *Endomychura* resembles the former genus in its long tarsometatarsus and lack of barred summer plumage, and the latter genus in its lack of elongated head plumes and in the shape of its bill. As bill form is in many cases a good indication of relationship, it is understandable that *Endomychura* should be thrown toward *Brachyramphus*, even in the light of plumage and tarsal characters which hint strongly otherwise.

With this background, let us proceed to a deeper study of the group. In any taxonomic treatment of the Alcidae, two considerations should be kept in mind. First, the group is an old one, both in a geological and in an evolutionary sense as is shown by the fossil record and by the relatively large number of small genera and monotypic species; and second, the genera and species differ from each other in what at first sight appear to be a bewilderingly complex assortment of characters. These can, however, be broken down into three categories of varying importance in showing phylogenetic relationships. Some characters, such as the presence of a white patch on the side of the head, turn up more or less at random throughout the family. These seem best explained by the presence of an inherent germinal predisposition to mutations of a similar type, and should be considered as an indication of the relationship of all members of the family as a whole. Other characters, such as the deepening of the bill and the presence of elongated feathers on the head, appear as parallel trends which run through different groups of species within the family and which should be taken as indications of the relationship of the groups of species rather than that of immediate relationships of the species at equivalent evolutionary stages in different groups. The third type of character is that which has been developed in and is to be found exclusively in a single phyletic group. These characters are generally the oldest from a phylogenetic standpoint and may be illustrated by the egg shape in the auks and murre. There is some overlapping in these categories, but on the whole, they are sufficiently distinct to provide a basis for classification and evaluation. Certainly a lack of understanding of the parallel trends has

been responsible for misinterpretations of the interrelationships within the family under consideration. These trends appear, by and large, to be nonadaptive and to be reflections of the inherent genetic constitution of the family as a whole.

Avian taxonomists have placed too much importance on the shape of the bill which, admittedly, is an important clue to the relationships of many birds, but which occasionally runs "hog wild" as in the Geospizidae and Drepanididae, and is even subject to considerable sexual dimorphism as in *Heteralocha acutirostris*. The principal variations in bill form in the Alcidae differ from those of the Geospizidae and Drepanididae in that they represent a series of parallel trends rather than a sort of adaptive radiation. These parallel trends appear analogous to those mentioned by Mayr (1942:279-280) as occurring in the Old World flycatchers (Muscicapidae), but involve deepening com-

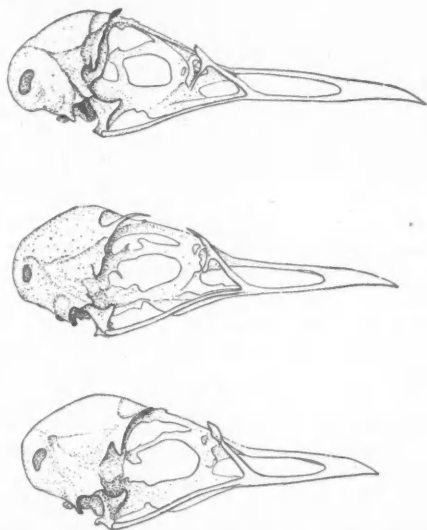


Fig. 27. Lateral aspect of the skulls of murrelets. Top, *Brachyramphus marmoratus* (M. V. Z. no. 70637); center, *Endomychura hypoleuca* (no. 46844); bottom, *Synthliboramphus antiquus* (no. 7658); all natural size.

bined with lateral compression instead of flattening. The least differentiated bills in the family are to be found in the genera *Brachyramphus*, *Endomychura*, and *Uria* although there is a tendency toward lengthening visible in *Uria aalge* and *Endomychura craveri*, a development which reaches an extreme in *Cepphus carbo*. Trends toward deepening and lateral compression are to be found in *Synthliboramphus* and the auklets, auks, and puffins.

When viewed in this light, the similarity of the bills of *Endomychura* and *Brachyramphus* loses its significance, for it is clear that the retention of an obviously "primitive" character by two groups of birds is not necessarily an indication of close relationship. In fact the two genera under consideration are rather widely divergent in other skeletal as well as plumage characters.

Aside from the differences in bill form, the major differences in the skulls of the three murrelet genera are to be found in the temporal region. Immediately posterior to the orbit there is a shallow depression which runs posteriorly and ventrally from the depression in which the nasal glands lie. In *Brachyramphus* this depression is separated dorsally from the bed of the nasal gland and posteriorly from the temporal fossa by sharp ridges. In *Synthliboramphus* the depression is also set off by ridges, but the dorsal ridge does not approach the bed of the nasal gland. In *Endomychura* it is confluent with the temporal fossa and is separated from the bed of the nasal gland by a low, broad ridge. Furthermore, the temporal fossae of *Synthliboramphus* and *Endomychura* are considerably more extensive than that of *Brachyramphus*, the ridges forming the upper and posterior borders lying nearer the top and rear of the cranium, respectively, in the two former genera (see fig. 27).

The significance of the characters of the pelvis and hind limb of the Alcidae has been largely overlooked. In these structures there are two possible classes of adaptational development. The first of these is for swimming and diving, but as the wings are, as far as we know, the sole means of submarine propulsion, very great diving modifications in the hind limb are not to be expected. And outside of a few characters in *Synthliboramphus*, *Endomychura*, *Alca*, and *Pinguinus*, there is little to suggest this type of adaptation.

The second class of modifications includes those connected with breeding habits. Here an interesting group of radiating adaptations has developed, beginning with the generalized guillemots (*Cepphus*) which show a variety of nesting habits and branching to the auks and murres which nest on open ledges, to the dovekie and most auklets which nest in crevices, and to the puffins and *Synthliboramphus* which use burrows. I have elsewhere (Storer, in press) divided the family into seven natural groups largely on the basis of pelvic and hind limb structure and characters connected with breeding habits. The two categories are in most cases so well correlated that I am strongly convinced that characters in the hind limb are important in showing relationships even where their relation to breeding habits has yet to be fully determined.

As the afore-mentioned paper describes the differences in pelvic and hind limb structure in some detail, it will be unnecessary to give here more than a brief discussion of those characters of the murrelets. The accompanying photograph (fig. 28) clearly shows the broad, flat preacetabular ilium, the relatively short postacetabular ilium, ischium, and pubis, and the generally broad, weakly fused pelvis of *Brachyramphus*. The relatively long, narrow pelvis of *Synthliboramphus* and *Endomychura* plus the long, slender tarsometatarsus with its "streamlined" articulations for the toes are strikingly different from the same bones of *Brachyramphus* and are suggestive of diving and swimming modifications such as are found developed to a much higher degree in *Gavia*, *Colymbus*, and the extinct *Hesperornis*. In the accompanying drawing (fig. 29) showing the tarsometatarsi of *Brachyramphus*, *Endomychura* and *Synthliboramphus*, the similarity of the last two genera and the difference between them and the marbled murrelet is obvious.

The short tarsometatarsus of *Brachyramphus* as measured on the skin has long been used as a character for separating this genus from the other murrelets. Shufeldt (1889), in his description of the murrelet skeletons, has indicated the principal differences between the tarsometatarsi of *Brachyramphus* and *Synthliboramphus* and has given a table of measurements of the leg bones of these genera. Unfortunately, the measurements for *Brachyramphus* are listed after *Synthliboramphus*, and vice versa, and no

conclusions regarding the relationship of these genera with each other or the other alcids were drawn from the data.

In connection with the tarsometatarsal length, it should be noted that in the same list of taxonomic changes in which *Endomychura* and *Brachyramphus* were combined, the American Ornithologists' Union Check-list Committee accepted Murphy's separa-

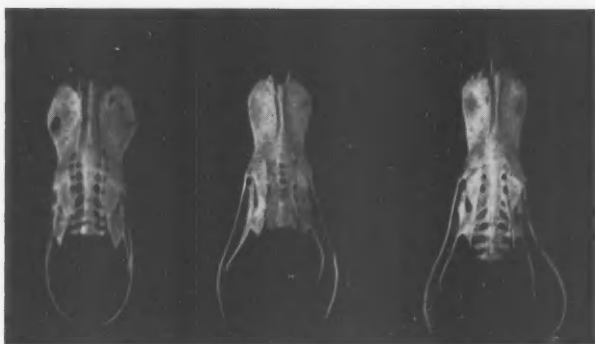


Fig. 28. Dorsal aspect of the pelvises of murrelets. Left, *Brachyramphus marmoratus* (M. V. Z. no. 27096); center, *Endomychura hypoleuca* (no. 46844); *Synthliboramphus antiquus* (no. 19045).

tion of *Loomelania* from *Oceanodroma*. Murphy (1936:744-745) bases his conclusions primarily on the ratio of the length of the tarsometatarsus to that of the femur. In the accompanying table, I have shown this proportion for four species of murrelets. The difference between *Brachyramphus* and *Endomychura* is self-evident as is the similarity between the latter and *Synthliboramphus*. Furthermore, *Loomelania* is intermediate between *Oceanodroma* and *Oceanites*, whereas *Brachyramphus* and *Endomychura* represent the extremes of the whole family Alcidae (a statement based on measurements of skeletons of representatives of all fourteen alcid genera). The Committee's precedent in the case of *Loomelania* should not be disregarded in the case of *Endomychura* in which there exist important differences in pelvic, plumage, and other characters which have yet to be demonstrated in the case of *Loomelania*.

Species	Number	Range	Average
<i>Brachyramphus marmoratus</i>	7	68.9 to 73.8	71
<i>Endomychura hypoleuca</i>	2	109.5 to 109.9	110
<i>Endomychura craveri</i>	4	104.8 to 106.5	106
<i>Synthliboramphus antiquus</i>	14	102.0 to 105.0	103

As might be expected from the similarity of the general habits of the birds, no significant differences in the three genera were found in the proportions of the wing segments expressed as per cent of the humerus. However, the total length of the wing (obtained by adding the over-all length of the humerus, radius, carpo-metacarpus, and the two phalanges of digit two) expressed as per cent of the body length (the distance between the anterior articular surface of the acetabulum and the anterior articular surface of the first thoracic vertebra) appears to be significant. In five skeletons of *Brachyramphus marmoratus*, this ratio varies from 183 to 192 with an average of 187, whereas seven specimens of *Synthliboramphus antiquus* vary from 202 to 222 with an

average of 212. The two available specimens of *Endomychura craveri* and the one of *E. hypoleuca* fall in or near the range of *Synthliboramphus*, the ratios being 220, 223, and 204, respectively.

The difference in wing length is further shown in the ratio of the length of the wing measured on the skin, using the distance between the carpal joint and the tip of the longest primary. For this purpose ten specimens each of *S. antiquus*, *E. craveri*, and *B. marmoratus* were selected at random from the collection of the Museum of Vertebrate Zoology, the wing lengths measured and averaged, and this figure divided by the average body length obtained by averaging the body lengths used in the preceding ratios. The percentages thus found are *Synthliboramphus* 200, *Endomychura* 197, and *Brachyramphus* 171.

Reduction of the wings has occurred frequently and independently in diving birds which use their wings for underwater "flying." The value of this adaptation is due to the density of the liquid medium in which the optimum wing size as illustrated by the penguins and the great auk is considerably smaller than that required to engage in aerial



Fig. 29. Anterior aspect of tarsometatarsi of murrelets. Left, *Brachyramphus marmoratus* (M. V. Z. no. 70637); center, *Endomychura craveri* (no. 54725); right, *Synthliboramphus antiquus* (no. 19045); all approximately $\times 1\frac{1}{2}$.

flight. As the wings of all alcids are small in proportion to the body weight, and as there has been great reduction in the size of the wing in the great auk and presumably in the fossil *Mancalla*, it is natural to expect some reduction in the wings of other alcids. Such changes are another example of parallel trends, and as such should not in themselves be considered important in determining relationships of genera within the family. However, I am giving the above figures because they add weight to the other evidence presented.

In the alcids, the general plumage pattern is fairly constant within each group, although parallel trends toward elongated head plumes occur and white patches on the side of the head appear at random. Hence the occurrence in *Brachyramphus* of a white scapular patch and of a type of summer plumage unique among alcids in its type of feather pattern and equalled only by one genus (*Cepphus*) in its extent, is indicative of the distinctness of this genus and suggests unusual breeding habits. The lack of seasonal differences in plumage in *Endomychura* is also unique in the family. *Synthliboramphus* is intermediate, having a partial prenuptial molt. *Endomychura* also differs from the other two genera in the number of rectrices (12 as opposed to 14).

The eggs of murrelets of the genus *Endomychura* are variable in color, markings, and shape. Those of the ancient murrelet (*Synthliboramphus*) are larger (as is to be expected in a larger bird) and are rather uniform in shape, color, and markings. They can, however, be matched in these three respects by some eggs of *Endomychura*. Two eggs appear to be the normal number for a set in both genera. This, and the color and markings should be considered primitive characters if, as it is usually assumed, the alcids are derived from laro-limicoline ancestors. The scant available data on the eggs of *Brachyramphus marmoratus* and *B. brevirostris* indicate that a single egg is the rule in this genus. The shape of the egg is similar to that of *Synthliboramphus* (and hence some eggs of *Endomychura*) whereas the ground color and markings of eggs of the genus as illustrated in Bent (1919, pls. 48 and 49) differ from those of *Endomychura* and *Synthliboramphus*. However, until a series of eggs of *B. marmoratus* and *B. brevirostris* can be secured and the extent of the variation in the eggs of these forms can be determined, the use of oölogical characters in speculations on the relationships of these forms is ill-advised.

From the evidence herewith presented, it will be seen that the murrelets of the genus *Endomychura* are most closely related to the ancient and Japanese murrelets (*Synthliboramphus*). The reason for their having been included in the genus *Brachyramphus* appears to lie in their both having a small, primitive type of bill. *Endomychura* appears to be the most primitive genus of the Alcidae. This is evidenced by the shape of the bill, the lack of seasonal differences in plumage, nesting habits, number and color of eggs, and small size. *Synthliboramphus* is an offshoot of this genus, differing in having elongated head plumes and a black throat in the breeding plumage, a deepened and partly colored bill, in being slightly larger, and in digging a nesting burrow. *Brachyramphus*, if derived from the same genus (which I doubt) has diverged much more widely as is evidenced by the barred summer plumage, short tarsus, and pelvic and cranial differences; it should be placed in a group by itself.

The relationship between *Endomychura* and *Synthliboramphus* parallels that between *Ptychoramphus* and *Aethia* or *Cyclorrhynchus*. In each case the more primitive genus (*Endomychura* or *Ptychoramphus*) agrees with the more advanced (*Synthliboramphus* or *Aethia* or *Cyclorrhynchus*) in skeletal structure and eggs, and differs in having a less deepened bill, in lacking elongated plumes on the head, and in having a more southern distribution. In connection with the last, it will be remembered that Matthew (1915) postulated that the more highly evolved forms of a group develop near the center of dispersal of the group and force the more primitive forms to occupy the peripheral parts of the range of the group. As the center of dispersal of the Alcidae certainly lies on the northern fringe of the Pacific Ocean, the fact that the most primitive genus of both the murrelets and the auklets has in each case the most southern distribution is further evidence to support Matthew's hypothesis.

As the genus is a purely artificial category adopted by the systematist for his own convenience, the inconvenience of unnecessary or erroneous changes should be seriously weighed in making any proposed alteration in generic names. This I fear has been all too often neglected by over-eager taxonomists. Combination of the genera *Endomychura* and *Synthliboramphus* is a borderline case which "splitters" could never attempt to propose and which "lumpers" would jump to make. The gap between these two genera is so distinct that each name suggests a definite series of characters applicable to the two species of each genus. Hence it would be no inconvenience to keep these genera separate at least until a definitive study can be made. Such a study should at least include dissections of the pelvic region and leg and of the musculature of the tem-

poral region, a careful analysis of the plumage differences, and a study of the courtship pattern and breeding habits of the forms involved. This work should also be done with an eye to solving the further problems of the relationships of *Ptychoramphus*, *Cyclorhynchus* and *Aethia*, *Fratercula* and *Lunda*, and of *Pinguinus* and *Alca*.

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FOOD HABITS OF THE BARN OWL

By ALBERT C. HAWBECKER

Over a period of several years I have collected, more or less at random, a number of pellets of the Barn Owl (*Tyto alba*). The collections were made over a wide area in central California, and all pellets were gathered during the nesting season, with one exception from under nests. Drs. A. H. Miller, S. B. Benson, and E. R. Hall of the Museum of Vertebrate Zoology, University of California, and Dr. R. M. Bond of the Soil Conservation Service either identified or assisted in the identification of the food items. Identification in most instances was made on the basis of skulls so that there is little chance of duplicate listing of individual animals.

The accompanying map (fig. 30) shows the localities from which the pellets were gathered. The numbers used in the text from here on refer to those in the tabulation of food items. Three types of habitat are included in the study. Santa Cruz and western Monterey counties are in the coastal Transition Zone, whereas eastern Monterey and western San Benito counties are in the Upper Sonoran Zone, and eastern San Benito and western Merced and Fresno counties are in the Lower Sonoran Zone. Thus we find Barn Owls ranging in this sector from a well forested, humid region to one that is absolutely treeless and shrubless.

The Callaghan (2) and Vass (1) collections were made to afford material for talks before local farmer groups. Definite evidence of this sort gathered from a near-by farm was of far greater value in emphasizing the value of hawks and owls than were results quoted from some journal. Very often the pair of owls had been seen by someone in the audience. The Vass collection gave me a little insight on the range of the Barn Owl's foraging. I had made a study of the Santa Cruz kangaroo rat (*Dipodomys venustus venustus*) within one-fourth of a mile of this nest, yet no rats were found in the pellets even though the rats were present in moderate numbers. No pocket mice (*Perognathus californicus*) were found either even though they were common in open land with the kangaroo rats; from observations elsewhere they appear to be a favored type of food of Barn Owls. Evidently the Barn Owl does not forage that far for food if it is otherwise available, as was probably true in this case.

It is interesting also to note (see table) that the Barn Owl is cannibalistic. Errington, Hamerstrom and Hamerstrom (Iowa Agr. Exp. Sta. Res. Bull. 277) found that Horned Owls (*Bubo virginianus*) were cannibalistic, but I am unable to find other such records. The owl remains I found were those of young birds, however, so it seems possible that the young may have died in the nest before being eaten or that they were very much smaller than the others, as is often the case, and were used for food by their older brethren.

A large number of birds was taken by the owls in the first three areas. This reflects somewhat the nature of the country, which was wooded and brushy with interspersed open spaces. Other places where birds were taken, even though many of those birds were open-land types, were somewhat like this area. The areas where no birds were found in the pellets were generally devoid of cover, but definitely not of birds. Errington (Condor, 34, 1932:176-186) noted, in Wisconsin, that the Barn Owl seemed unable to change from a mammalian diet to an avian one and therefore perished in the midst of an abundance of winter birds. This, of course, is in a different climate, but the owls in California seemed to have no particular trouble in picking up birds as well as

Number of pellets		Locality	
MAMMALS			
1	128	Vase Ranch 1939	3
2	21	Callahan Slough 1938	3
3	46	Struve Ranch 1940	2
4	101	Bitterwater 1939	1
5	29	Bitterwater 1941	26
6	23	Ordanilla 1941	1
7	19	Lower Little Panoche, 1941	1
8	28	Upper Little Panoche, 1941	2
9	28	Mercy Hot Springs, 1941	6
10	26	Panoche 1941	2
11	31	Silver Creek 1941	12
BIRDS			
1	128	Vase Ranch 1939	3
2	21	Callahan Slough 1938	3
3	46	Struve Ranch 1940	2
4	101	Bitterwater 1939	1
5	29	Bitterwater 1941	26
6	23	Ordanilla 1941	1
7	19	Lower Little Panoche, 1941	1
8	28	Upper Little Panoche, 1941	2
9	28	Mercy Hot Springs, 1941	6
10	26	Panoche 1941	2
11	31	Silver Creek 1941	12
MAMMALS			
Scapanus latimanus			
Neurotrichus gibbsii			
Sorex ornatus			
Thomomys bottae			
Perognathus inornatus			
Perognathus californicus			
Dipodomys heermanni			
Dipodomys ingens			
Onychomys torridus			
Reithrodontomys megalotis			
Peromyscus californicus			
Peromyscus maniculatus			
Peromyscus boylii			
Peromyscus truei			
Neotoma fuscipes			
Microtus californicus			
Rattus rattus			
Mus musculus			
Lepus californicus			
Sylvilagus bachmani			
BIRDS			
Lophortyx californica			
Zenaidura macroura			
Tyto alba			
Otocoris alpestris			
Sturnella neglecta			
Piranga ludoviciana			
Pipilo maculatus			
Pipilo fuscus			
Zonotrichia leucophrys			
Melospiza melodia			
Gallus domesticus			

mammals. The broad range of bird species taken would not point to lack of adaptability as Errington suggests in his study.

The collection made at the Struve locality (3) was for the purpose of comparing the food habits of another raptor with those of the White-tailed Kite, *Elanus leucurus*

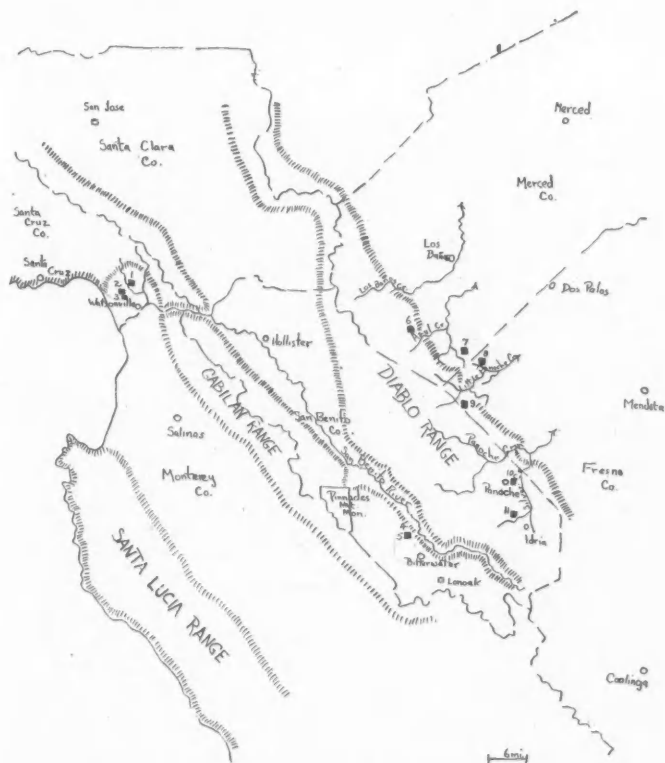


Fig. 30. Map of western central California showing stations where Barn Owl pellets were obtained; localities are marked with black squares and numbers.

(Hawbecker, Condor, 44, 1942:267-276). The results obtained were interesting in that they compared the food of a night-flying raptor with that of a day-flying one. It is presumed, from the absence of kangaroo rats in the Vass collection, that the foraging range of the owl is not greater than that of the kite, which is about one-half mile. The owl which roosted, but did not nest, in a barn within one hundred yards of the kite's nest is seen to have a much greater variety of food items than the kite, which subsisted almost entirely upon meadow mice. It appears that these two may have competed for food to some extent, although the population of meadow mice was very great. It was interesting that, in this case, both a night-flying and a day-flying bird had the same rodent species for their staple diet.

The Struve sample again demonstrated the value of the Barn Owl in picking up species that are not commonly trapped. The shrew-mole was never trapped, though often trapped for, in this place.

The two Bitterwater collections (4, 5) were made in a group of Barn Owl nests during banding operations. Four nests of bandable young were found here on May 4, 1939, while several other nests of young too young to band, or nests of eggs, or nests that had already been abandoned, were found. These collections were made to see what such a concentrated population of Barn Owls might find to feed upon in a dry, alkaline



Fig. 31. Steep barranca near Bitterwater, San Benito County, California.
Typical nesting hole of Barn Owl.

country. These collections and other observations lead one to wonder how much effect these owls have upon the rodent population of a district. It seems that the near-by population of rodents would be immediately cleaned out if it was not large, but this does not seem to be the case as is shown by the following: While banding here with David W. Dresbach on May 14, 1941, we picked up two young kangaroo rats, presumably *Dipodomys heermannii*, in the barranca directly below where the owls were nesting. We thought possibly an owl had captured the parent, and the young, becoming hungry, had wandered to the mouth of the burrow. Up to this time we had banded 23 nestlings so it seems that if the pressure had been very great upon the rats, or upon the owls, that the parent would have been picked up long before this. It is possible that

young rodents are being born at the same period when the young owls are hatching and that this increase keeps the rodent population at a fixed level. Errington, Hamerstrom and Hamerstrom (1940) feel that it is doubtful if the Horned Owls they studied exerted a dominant influence over the populations of the prey animals taken. They feel that when one species gets low the predators turn to more numerous animals of other species before the base population is affected.

The collections numbered 6 to 11 were made in connection with a study of the Nelson antelope ground squirrel (*Citellus nelsoni*). I hoped to find the remains of squirrels in pellets taken in areas where I had not seen them, but no squirrel remains were found due to the later-discovered fact that the foraging hours of prey and predator do not overlap. The Panoche collection (10) was made near a colony of the squirrels to act as a check, but none was found there either. Tappe (Jour. Mamm., 22, 1941: 117-148) found one represented in what was possibly a Barn Owl pellet from this last-named locality.

An interesting scene was stumbled upon when the Silver Creek collection (11) was made. On May 22, 1941, I was hunting a nest near the junction of Silver Creek and the Idria road when I came upon two young owls on a little shelf about five feet above the floor of the wash. The part of the wall that had contained their burrow had apparently fallen and they had landed there. They were being well cared for, however, as was evidenced by the five fresh kangaroo rats and the one gopher with them on the shelf. The next day the total had increased to 18 fresh kangaroo rats. The survival of the young in this open place as well as the faithfulness of the parents in the face of great difficulty seemed out of the ordinary.

The most noteworthy roosting place found was in the depths of a hand-dug well about 30 feet below the surface. This was near location 6.

In looking over the whole list of food, it is evident, as is generally known, that the Barn Owl serves as a good sampler of the small mammals of a given area. The collections made in locations 1, 2, and 3 yielded most of the small mammals of the Watsonville region. The kangaroo rat and pocket mouse were not within range of any nest that I collected from, and apparently the local chipmunk is no more susceptible to capture than any other, as I find no chipmunks listed in any other food habit study of this owl. The small mustelids are apparently also let alone. It appears that one must be sure to collect from under nests or roosting places in all types of habitats within a given region to obtain a complete picture of food selection. The Bitterwater, Panoche, and Silver Creek collections appear to be fairly good samples of those respective regions, but the others do not. I would suggest collecting from under several nests in a given locality rather than depending upon one where the bird might be concentrating on one or two prey species.

The owl also picks up rather rare species that one may trap for but never get, such as the shrew-mole. The shrews in locations 4 to 8 were surprises to me. There was habitat of a sort for them, but the water in these places dries up in many of the years, and the country may be hot and dry, and in some cases coverless except for grass in the bottoms. The Old World rat in the Bitterwater location was interesting as it was so far from any habitation; it must have been brought in with the grain seed or feed. The house mice probably were brought into the sheep country in the feed that supplements the natural growth.

Why does the Barn Owl eat more of one thing than another? Is it because it is more numerous, more tasty, easier to catch, or because the owl is more accustomed to it? The selection appears to be based partially upon numbers and ease of capture. From

breeding data collected around Watsonville, it appears that the dispersal of young gophers as well as surface food-gathering by the parent gopher must take place chiefly during the nesting time for the owls; this might account for ease in their capture. The Struve collection favored meadow mice and harvest mice which were numerous in the alfalfa in this area, and which certainly appear from the White-tailed Kite's method of attack to be easy to catch. In the Vass collection meadow mice were certainly as easy to catch, but due to the lack of grassy cover were not as numerous as gophers in near-by orchards or wood rats in brush. Gophers were numerous in the Bitterwater area, if diggings are a reliable indication, and trapping proved the presence of numerous pocket mice. It is overgrazed, too hot, and too dry for meadow mice. Localities 6 to 10 were generally hot, hard, and dry with little sign of gophers, but 11 was along a live creek where many diggings were seen. Why more *Peromyscus* were not found in the first three collections is puzzling, as they were numerous in this area as well as in most of the others, according to trapping records. It seems that kangaroo rats should have been more numerous in the collections 6 to 9. Apparently it was too easy to catch pocket mice.

It appears then that Barn Owls will pick up anything that they can handle that gets in their way. They take most of whatever is easiest to catch, either because of number or ease of approach. According to all indications they do not travel far for prey, even for what appears to be a favored type.

Madera, California, April 1, 1945.

FROM FIELD AND STUDY

Western Red-tailed Hawk Catches Cooper Hawk.—In December, 1943, I was driving along a road on the south side of the Santa Clara Valley about four miles east of Fillmore, Ventura County, California, when a female Western Red-tailed Hawk (*Buteo jamaicensis calurus*) passed over me, traveling very fast. It flew into a rather open pine tree along the road, caught something and continued on down the road. She tried to alight in a rather scraggly eucalyptus tree a short distance ahead, missed her footing and fell to the ground. I arrived about that time and she flew away, leaving her prey on the ground under the tree. I stopped and got out to see what it was and was much surprised to find an adult male Cooper Hawk (*Accipiter cooperii*). It was still alive, but paralyzed from the wings back to the tail. I dropped it to the ground and was much surprised to see it take wing and fly for about fifty yards out into an orange orchard across the road. I went over and found it hanging by one claw to an orange branch, still alive and struggling. I carried it over to the road, killed it with a stick and placed it at the side of the road in plain view of the Red-tail which was perched on an electric pole near by. I passed there the next day and found no sign of the Cooper Hawk, so possibly the Red-tail had returned for her dinner.—SIDNEY B. PEYTON, Fillmore, California, May 22, 1945.

The Blue Goose in California.—While on a visit to Imperial County, California, on February 5 and 6, 1945, the writer was told of an "off-color" or "odd looking" goose seen with a large concentration of Lesser Snow Geese feeding on a recently planted barley field near the mouth of the Alamo River. This bird was reported by some observers as a Blue Goose and by others as possibly an Emperor Goose. The writer watched several thousand white geese feeding in the same area on the morning of February 6, without seeing any sign of the unidentified visitor.

On February 11, 1945, Gilbert H. Wardwell, while on regular work studying the movements and feeding habits of waterfowl, found and picked up a dead male Blue Goose in full adult plumage. The bird weighed 4 pounds, 12 ounces. It had not been dead very long before being found. Mr. Wardwell, who had previously seen the "off-color" goose, at once recognized his find as the bird previously noted, and, believing it to be a Blue Goose, preserved the skin as a "flat specimen" and sent it to me for verification. It proved to be a typical adult Blue Goose (*Chen caerulescens*) in fine plumage.—STANLEY G. JEWETT, Portland, Oregon, April 14, 1945.

Observation of the South American Condor.—It was my privilege to spend seven months in Ecuador in 1944, the major portion of the time in the field. While riding across the high, wind-swept páramos we often climbed to altitudes well above 13,000 feet and frequently saw South American Condors (*Vultur gryphus*) wheeling a thousand feet or more above us. On one field trip we crossed the extensive páramo between Atuntaqui and Piñan and camped the first night at 11,200 feet on the brink of the last canyon that afforded firewood before crossing the higher portion of the páramo. We had been on the lookout for condors during the latter part of the day, but none appeared until nearly sunset when two of the great birds swept rapidly across the valley.

The following day, June 21, we broke camp under an overcast sky, rode through a light rain for nearly three hours, and then, when we had given up hope of seeing condors, we sighted two of them on a sharp ridge about two hundred feet above the trail. They were sitting with their shoulders hunched up alongside their heads, looking almost as miserable as our Indian cargadores in the drizzle and swirling mists. We angled slowly upward toward them and they permitted us to approach within sixty or seventy feet before taking to the air.

They launched themselves by taking three or four clumsy hops along the knife-like ridge and by vigorously flapping their powerful wings. All awkwardness disappeared the instant they were fully air-borne! Their soaring appeared completely effortless. In a few seconds they were no longer visible to us, shut off by the scudding masses of mist that rolled over the adjacent ridges. Under the weather conditions at the time, the clouds swirling right to the top of the ridge, they soared within a few feet of the earth instead of climbing rapidly as soon as they got into the air.

Shortly after noon the weather began to break and in a few minutes the sky was swept nearly clean of mist. Soon we saw eight condors soaring slightly above the summit of a long, grass-grown ridge southeast of the trail. This was at an elevation of 12,800 feet. Then three more were seen, then another, and another, until we counted thirty-one in sight at one time. We were reasonably sure that we saw ten or fifteen more condors during the hour and a half that we watched them, but no more

than thirty-one were visible at any one time. The huge birds soared over the rim of the ridge and out of sight, singly or in small groups, but shortly either the same birds or others kept reappearing at other points from the opposite side of the same ridge. We estimated that there could easily have been fifty of them along that one valley and the ridge they crossed and recrossed in their wheeling flight. Their activity during mid-day may well have been influenced by the dense, continuous layer of clouds that had blanketed the whole páramo and its adjacent peaks during the earlier hours. On subsequent days when the early morning hours were clear the condors were active for only two or three hours immediately following sunrise and again for a short time just before sunset. Rarely were they seen during the middle of the day.

We were in the Pifian region for some days and saw condors every day, but never again so many at any one time. A half dozen within sight at once was a common occurrence, and not infrequently we counted ten to fifteen within sight of the unaided eye. A lone condor was a rarity, at least within the scope of our limited observations.

Just after sunrise one morning several of our cargadores were attracted by the actions of three condors which had been under observation for several minutes as they wheeled in great circles two or three thousand feet above us. They suddenly plunged downward toward a small draw about a half mile away and disappeared behind an intervening ridge. One of the Indians declared that the condors were attacking a calf or a deer. The mayordomo of our group of native helpers grabbed a shotgun and hustled across the páramo in an attempt to drive off the marauding condors, or to obtain the fresh meat for our own use in case the raptors killed the animal before he reached it. By the time he reached the rise overlooking the point where the condors had disappeared, the calf, for so it proved to be, was dead.

The mayordomo, Manuel Giler, brought the animal back to camp so I had an opportunity to examine the wounds inflicted by the condors and to judge of their manner of attacking the flesh of their kill. A gash on the left side of the chest cut clear through into the chest cavity, between the ribs, and the lung was deeply torn. The heart, however, had not been injured, but a considerable quantity of blood was in the chest cavity. Another gash exposed the flesh of the "saddle" just above the left kidney and perhaps a pound of the tenderloin had been stripped out. Other wounds were present on the nose and about the head of the calf, whether made by claws or by the beaks of the attacking birds I am unable to say. One eye had been pierced but not entirely plucked from its socket. The abdominal wall had been penetrated and about a third of the animal's viscera had been dragged out through a hole less than two inches in diameter. Aside from the areas mentioned, the skin was not torn and the condors appeared to have begun feeding by working through the comparatively small holes instead of by stripping away the covering skin.—IRA L. WIGGINS, *Natural History Museum, Stanford University, California, March 23, 1945.*

Feeding Habits of the Clark Nutcracker.—Like the Canada and Steller jays, the Clark Nutcracker (*Nucifraga columbiana*) is often attracted to mountain camps and cabins by food scraps. Apparently the nutcracker, like other corvids, will feed on meat or carrion, but usually such feeding is done upon the carcasses of mammals or birds. On a trip to Yellowstone National Park in January-February, 1944, however, Dr. E. R. Quortrup of the Bear River Migratory Bird Refuge observed a Clark Nutcracker feeding upon the flesh surrounding the lacrimal ducts of an injured cow elk.

Feeding upon sores or freshly made brands of livestock or upon the sores of big game, is not a particularly uncommon practice of the Magpie (*Pica pica*). Adolph Murie, in his "Ecology of the Coyote in Yellowstone" (Fauna Series 14, Conservation Bulletin 4, National Park Service, 1940), mentioned finding magpies that apparently were picking at mites and ticks on live mountain sheep, elk, and bison; he also found ticks in the stomach of a dead magpie. M. P. Skinner, in 1920, reported Clark Nutcrackers in Yellowstone National Park congregating on grounds where elk had bedded; here the birds were finding and consuming large numbers of ticks. O. J. Murie writes (letter, March 1, 1944) that he found a Clark Nutcracker with engorged ticks in its throat. Perhaps this habit of seeking parasites on big game or livestock may lead these birds occasionally to probe deeper and obtain live flesh.

Ten stomachs, critically analyzed in the laboratory of the Fish and Wildlife Service, revealed that these Clark Nutcrackers had taken the following foods in approximately this order of abundance: pine seeds, cicadas, grasshoppers, oats and other grains, spiders, blister beetles, Hymenoptera (including ants, bees, and wasps), weevils, ticks, ground beetles, rove beetles, meadow mice, scarab beetles, and miscellaneous insects.—CLARENCE COTTAM, *United States Fish and Wildlife Service, Chicago, Illinois, May 4, 1945.*

Miscellaneous Records of Birds Uncommon in Utah.—At various times in recent years the writers have, in their general collecting, obtained birds of relatively rare occurrence in Utah, at

least as indicated by the literature. The data pertaining to these are presented below. A few noteworthy specimens are also reported that have been brought into the University of Utah Museum of Zoology by others. Certain of the specimens have been identified as to subspecies by Alden H. Miller at the Museum of Vertebrate Zoology and we are indebted to him for this service.

Aix sponsa. Wood Duck. Although probably not uncommon in pioneer days, this duck is relatively rare in Utah today and few records are to be found in the literature for the State. An important specimen, therefore, is a male received from Cyril Fullmer. The bird was taken in the course of a duck hunt at a slough two miles north of Circleville, 5800 feet, Piute County, on October 16, 1942.

Chlidonias nigra surinamensis. American Black Tern. The species breeds in small numbers at refuges and sloughs on the east side of Great Salt Lake in northern Utah and is an uncommon transient over the State. Records are so few, however, that another one may be of value. A male was taken from a pond near the Parrish Ranch, 5175 feet, 5 miles north of Ibapah Post Office, Tooele County, Utah, on May 20, 1942. It was one of three transient Black Terns.

Glucidium gnoma pinicola. Rocky Mountain Pigmy Owl. There are only about half a dozen records for Utah pertaining to this small resident owl. Two new ones are as follows: a male was picked up dead on January 12, 1941, in Memory Grove, 4400 feet, at the mouth of City Creek Canyon, Salt Lake City, Salt Lake County, Utah, by Gilbert Barton. A female was taken January 24, 1943, from a willow patch along the Weber River at 33rd Street, 4300 feet, Ogden, Weber County, Utah. This one was collected by Jim Poorman and Warren Jensen.

Hylocichla guttata guttata. Alaska Hermit Thrush. There are but three records of this subspecies that have been reported from the State. An additional one pertains to a transient male taken on May 8, 1942, from a willow patch on the east-central part of Antelope Island, Great Salt Lake, 4300 feet, Davis County, Utah. It is typical both as regards back color and wing length.

Hylocichla guttata polionota. Mono Hermit Thrush. A female taken with the preceding specimen from Antelope Island appears to be closest to this race. The specimen is too pale to be referred to *H. g. guttata*. It corresponds fairly well with intergrades between *polionota* and *guttata* which breed in the panhandle of Idaho, a population to which Bishop (Proc. Biol. Soc. Wash., 46, 1933:201) has applied the name *dwighti*.

Vireo solitarius cassinii. Cassin Solitary Vireo. This race is an uncommon transient in Utah; only a few specimens are on record. A male was taken at the base of the Wasatch Mountains, 5200 feet, 1 mile south of 36th Street, Ogden, Weber County, Utah, on October 6, 1941.

Regulus regulus olivaceus. Western Golden-crowned Kinglet. Woodbury (Condor, 41, 1939: 159-160) summarized all records for this bird up to 1939 and indicates that this kinglet is not only a summer resident in the mountains but also a flocking winter resident of the foothills. During the winter of 1944-45 small flocks were frequently seen on the campus of the University of Utah and one individual was picked up dying. Specimens taken in late years by the writers in Utah are as follows: a male from the west side of the Deep Creek Mountains, at the Queen of Sheba Mine, 8000 feet, Juab County, May 21, 1942; three specimens (2 males, 1 female) from Silver Lake Post Office (Brighton), 9000 feet, Salt Lake County, June 19 and July 10, 1943; a female from Heugh's Canyon, near the mouth of Big Cottonwood Canyon, 5000 feet, Salt Lake County, March 8, 1944; and the male, noted above, from the University of Utah campus, 4550 feet, Salt Lake City, February 15, 1945.

Dendroica townsendi. Townsend Warbler. This is another uncommon transient in Utah and few specimens have been reported. Another male was taken in Wheeler's Canyon, 5200 feet (a branch of Ogden Canyon), Weber County, on September 10, 1943.

Seiurus noveboracensis. Northern Water-thrush. A specimen taken in the spring of 1942 not only adds to the few thus far obtained in the State, but also presents an interesting case of variation. The bird was a male and was collected at the Parrish Ranch, 5175 feet, 5 miles north of Ibapah Post Office, Tooele County, Utah, on May 18, 1942. The back of this specimen is distinctive, being an extraordinary pure gray color, somewhat dark as in the race *limnaeus* yet not dark enough for that form. It corresponds more closely with *notabilis* in pallor but is not brown enough. In size it is entirely beyond the range of *limnaeus* and is not yellow enough beneath for that race either. About all one can do in light of our present knowledge is to call it an atypical specimen of the race *notabilis*.

Ammodramus savannarum perpallidus. Western Grasshopper Sparrow. A specimen taken recently constitutes an interesting rediscovery of this species in the State. It was reported by all the early collectors (Allen, Merriam, Nelson, Ridgway and Henshaw) around 1872 but seems not to have been detected since. The specimen, a male, was shot from a greasewood bush along U. S. Highway 40, 10 miles west of Salt Lake City, 4250 feet, on September 20, 1942. It was a lone bird.

Spizella arborea ochracea. Western Tree Sparrow. This sparrow has a seasonal status of winter visitant in Utah and in the writers' experience is fairly common. Only a few records, however, throw light on its standing, hence the following data are presented. A flock of about 100 Tree Sparrows was

encountered on January 25, 1941, in the trees and shrubs along the Jordan River near the Jeremy Ranch, west of the Cudahy Packing Plant, Salt Lake County, Utah. Three males and two females were taken as samples. Other specimens collected in recent years from small flocks are a female, taken on November 27, 1942, two miles west of Bountiful, 4300 feet, Davis County, and two females at the Belnap Ranch, 4260 feet, 2 miles north of Hooper, Weber County, collected on December 25, 1942.

Melospiza melodia merrilli. Merrill Song Sparrow. Several wintering Song Sparrows have been collected in recent years but with one exception they represent the breeding race, *montana*. The exception, a male, was taken at the Belnap Ranch, 4260 feet, 2 miles north of Hooper, Weber County, Utah. Although not typical, it seems referable to the race *merrilli*.

Plectrophenax nivalis nivalis. Eastern Snow Bunting. A specimen was collected by Ellis R. Wilson on November 29, 1939, at his home at Bountiful, Davis County, Utah. Another specimen of this species that has been in the collection of the University of Utah for several years is a male, taken by A. V. Hull, November 13, 1932, at the mouth of the Bear River, 18 miles west of Brigham City, Box Elder County, Utah. Johnson (Wilson Bull., 47, 1935:160, 294) reports Snow Buntings from the Provo area.—WILLIAM H. BEHLE and AARON ROSS, *Department of Biology, University of Utah, April 15, 1945*.

Cock Roosts of the Texas Nighthawk.—In the Condor for 1938 (196-197), Pickwell and Smith have called attention to separate congregations of males of *Chordeiles acutipennis texensis*, assemblages which they called "cock roosts." They did not determine the relationship of these males to females breeding in the same locality. My own experience with such roosts is not extensive but such as it is suggests that they are composed in part at least, and possibly altogether, of unattached, non-breeding birds. In combination with the notes on cock roosts I have included some observations on tree roosting since this custom has seemingly received little or no attention.

My first encounter with a cock roost was at Buena Vista Lake, in Kern County, California, a Lower Sonoran Zone locality where the Texas Nighthawk is a common summer visitant. Under date of June 21, 1921, my notes record the following: "In going through a piece of dry pasture land, dotted with occasional willow clumps and some scattering mesquite, I found quite a gathering of Texas Nighthawks in one of the smaller groves. There were about a dozen rather thin [ly foliated] trees in the clump and all told there were probably twenty (perhaps more) Nighthawks squatted on limbs at varying heights from the ground. Because they kept flying and weaving about through the trees I could not count them, but at any rate all were males. I am certain of this as I looked carefully for females as they flew about. The two which I shot were not in breeding condition. They refused to leave the grove for any length of time, but after flying around awhile all apparently returned. The favorite perches were fair-sized, horizontal branches but a few, as they returned, alighted on quite small twigs. They seemed to have a good deal of trouble in perching on such unstable roosts and did not remain long in such positions." September 15, 1921: "Two male Texas Nighthawks which were squatting lengthwise on limbs of a couple of isolated willow trees were taken. These were the only ones seen." June 19, 1922, with Loye Miller: "In one of the willow groves was the same assemblage of male Texas Nighthawks that was noted in 1921. There were about 12 or 15 and, as before, not one female was present. We found several other parties (also composed of males) in other parts of the willow land." Although the notes are ambiguous on the point, it may be stated that the grove mentioned was the identical one which was occupied in 1921. During January, 1926, tree roostings in small groups were observed in El Salvador but whether or not there was sex segregation my notes do not state.—A. J. VAN ROSSEM, *Dickey Collections, University of California, Los Angeles, December 31, 1944*.

The Calliope Hummingbird at Portland, Oregon.—On April 26, 1944, the Misses Mary Lou Moore and Mary Jo Moore of the Oregon Audubon Society found a dead hummingbird near their home in southeast Portland. Being familiar with the Rufous Hummingbird, the only hummer found commonly in the Portland area, they showed their "find" to several friends without obtaining a satisfactory identification. The bird was finally laid away in a refrigerator to await my return to the city. Nearly a month later the bird was given to me, still in a fair state of preservation. It proved to be a typical adult male Calliope Hummingbird (*Stellula calliope*) the first known record of the occurrence of this species in the Portland area and, in fact, the first reported occurrence west of the Cascade Mountains in Oregon.—STANLEY G. JEWETT, *Portland, Oregon, May 9, 1945*.

Winter Bird Observations in the Boise National Forest, Idaho.—During the winters of 1938-39 and 1939-40 the writer, as biologist of the United States Fish and Wildlife Service, was engaged in field work near the Deer Park Guard Station on the Boise National Forest in Idaho.

Since records of occurrence of the birds in the mountains of central Idaho are few, field notes based largely on sight records seem worthy of note.

An area of approximately thirty square miles which lies about eighteen miles east of Idaho City was studied in the course of the field work. It includes Hunter Creek in Boise County, and Horse-heaven, Trail, and Swanholm creeks in Elmore County at elevations of 4800 to 8000 feet. Forest Service timber types, with percentage area estimates based on type maps compiled from aerial photographs, are as follows: grass (5), brush-streamside (3), browse (5), ponderosa pine (33), lodgepole pine (2), Douglas fir-spruce (8), fir (4), Douglas fir-pole stands (16), Douglas fir-protective (18), subalpine (5).

Joe C. Rabb and Nolan West served as field assistants at different times. Dr. J. W. Aldrich of the United States Fish and Wildlife Service has kindly identified the specimens which were deposited in the Biological Surveys Collection.

Astur atricapillus. Goshawk. This hawk apparently hunted most intensively during the winters in the more open protective and sub-alpine timber types. During the first winter they were observed at Dusky Grouse kills five times and at snowshoe hare kills four times. On November 7, 1939, a Goshawk was flushed from a Dusky Grouse kill and on February 1, 1940, from a snowshoe hare kill. On March 29, 1940, one bird was seen near Swanholm Creek.

Aquila chrysaetos. Golden Eagle. *Haliaeetus leucocephalus*. Bald Eagle. In February, 1939, one Bald and two Golden eagles fed daily on elk and deer meat cached by poachers at Swanholm Creek, and in March one Bald Eagle was seen soaring over the Middle Fork canyon on several days. During December, 1939, two Golden Eagles were frequently seen close to the Deer Park Guard Station, but no other eagles were observed that winter.

Dendragapus obscurus pallidus. Dusky Grouse. This grouse is rather common in the area and detailed observations, which will be reported later, were made during the two-year period. Dr. Aldrich considers the specimens of this bird submitted to be intermediate between *pallidus* and *richardsoni*, but close to the former.

Bonasa umbellus phaios. Ruffed Grouse. Detailed notes on the fairly common Ruffed Grouse were also made throughout the two-year period. Skins of this bird were discussed by Aldrich and Friedmann in the Condor (45, 1943:98).

Canachites franklini. Franklin Grouse. This grouse was infrequently observed in areas of extensive lodgepole pine or spruce and in fir types in the remote portions of the area. The bird, locally known as the Foolhen, is so vulnerable to humans that it is quickly extirpated in areas adjacent to roads. It was interesting to note that although a human could approach within a few feet of these birds, they would "flush" readily from a dog, although usually they flew only far enough to reach a convenient tree.

Bubo virginianus lagophonus. Horned Owl. Although frequently heard in both winters, only one Horned Owl was seen and collected on February 4, 1940.

Megaceryle alcyon. Belted Kingfisher. In 1938-39 no kingfishers were observed in the area. They were seen, however, in the vicinity of Boise at 2600 feet elevation. In the second winter one female remained at Deer Park all season. Every evening she came to roost, with much "rattling," in the lodgepole and ponderosa pines just behind the buildings. This place has a southeast exposure and, as evidenced by the lack of snow for any extended period, it is probably the warmest place available in the vicinity. The bird was seen fishing along the North Fork during the day within a radius of one mile.

Ceophloeus pileatus picinus. Piliated Woodpecker. One bird was seen on Swanholm Creek on February 18, 1939, and on March 4, 1939; also an individual was seen on Hunter Creek on February 22, 1939. Due to the circumstances these were thought to be different birds. In January, 1930, three were seen on Hunter Creek on two occasions and one was collected. They were always seen in Douglas fir-spruce or in fir forest where nearly every "snag" had huge holes dug in it.

Dryobates villosus monticola. Hairy Woodpecker. One Hairy Woodpecker was seen in January, 1939, three single birds in February, 1939, and one again early in March. In January, 1940, two birds were noted several times, one of which was collected. All birds were noted in the ponderosa pine forest.

Dryobates pubescens. Downy Woodpecker. On several occasions in both winters one of these birds was seen in the company of bands of chickadees and nuthatches.

Picoides arcticus. Arctic Three-toed Woodpecker. Three-toed woodpeckers were not noted in the winter of 1938-39. In February, 1940, a male and a female were collected. These two birds had completely stripped the outer bark of three large ponderosa pines which had recently been killed by insects; the birds' crops were full of grubs.

Dryobates albolarvatus albolarvatus. White-headed Woodpecker. One was seen at Swanholm Creek on February 13, 1939, and one at Hunter Creek on January 15, 1940. The latter was collected. Each was feeding at the base of a large Douglas fir.

Cyanocitta stelleri annexens. Steller Jay. These jays, usually in pairs, were seen in many places and at various times throughout both winters. They are considered a nuisance by the marten trappers because they spring many "bait set" traps. One skin was made up from a bird caught in this manner.

Pica pica hudsonia. Black-billed Magpie. The magpie presents an interesting local seasonal distribution in this area. No birds were seen above approximately 3000 feet during the spring and summer period—March to August. Neither were their conspicuously built nests found in the higher areas. However, a small number of birds apparently rove throughout the higher country during the winter months. In the first winter a group of five magpies fed on elk carcasses at Swanholm Creek during January and February. In the fall of 1939 the first magpies were observed on October 12 and 13. A group of eleven was seen feeding on grasshoppers on November 27 and five remained in the immediate vicinity of Deer Park throughout the winter. During both winters one or two birds were often seen near timberline. These "mountain" birds are a minority, as very large flocks occurred during both winters in agricultural areas below 3000 feet in elevation.

Linsdale (Pac. Coast Avif. No. 25, 1937:57-58) cites several records of upward movement of these birds into mountainous areas but apparently there are no records of their remaining at the higher elevations throughout the winter.

Nucifraga columbiana. Clark Nutcracker. These birds were commonly noted in two's and three's at elevations of from 4000 to 7000 feet in both winters.

Penthestes gambeli. Mountain Chickadee. This was apparently the most abundant bird in the area during both winters. Flocks of ten to fifteen were common though they were difficult to count as they moved in an ill-defined group through the trees. In general most of their feeding was done in the Douglas fir timber. The Red-breasted Nuthatch, White-breasted Nuthatch, and Golden-crowned Kinglet were often associated with them. A few times chickadees were noted in "pure" flocks but usually two or three species were seen moving through the woods together.

Sitta carolinensis. White-breasted Nuthatch. Individual birds, with mixed flocks of other small birds, were seen frequently during both winters. The remains of a fresh kill made by a pine marten were found on the morning of March 1, 1939, under a large Douglas fir tree.

Sitta canadensis. Red-breasted Nuthatch. On several occasions two or three Red-breasted Nuthatches were seen in company with other small birds as noted above.

Certhia familiaris. Brown Creeper. A single bird was seen foraging on Douglas fir trees in the protective type at the head of Trail Creek, on February 22, 1940, and one individual was seen in ponderosa pines on Swanholm Creek on February 13, 1939.

Cinclus mexicanus. Water Ouzel. The movements of this bird in relation to cold spells and subsequent freezing and thawing of the rivers and streams were of interest. During the winter of 1938-39 no ouzels were seen on the Middle Fork above 4400 feet and none on the North Fork or smaller streams. They were, however, found below the 4400 feet elevation on the Middle Fork at an estimated density of two per mile of stream. This elevation represented about the line of the freezing-over of the Middle Fork, which varied over a one-mile stretch of the river. During cold spells the uppermost birds would be forced down the river, but as the short thaws came on there were always two or three that followed the "ice line" up the river. At the first sign of a general thaw early in March, ouzels were seen on Swanholm and Trail creeks where small stretches of rapidly running water opened up. In the following winter when the North Fork did not freeze over, a few pairs remained on this river all winter. One bird frequented Hunter Creek where none was seen the previous winter. The ouzel was again present at many places on the Middle Fork. These differences in occurrence correspond closely with those noted for the kingfisher.

Troglodytes troglodytes. Winter Wren. One wren, undoubtedly the same individual, was closely observed on February 5, 1940, and again in the same bushes on February 14 on Hunter Creek.

Regulus satrapa. Golden-crowned Kinglet. Flocks of these birds, usually in company of other small birds, were often seen in the area in both winters.

Pinicola enucleator. Pine Grosbeak. One individual, a female or young male, was seen at very close range in the same area in the Trail Creek drainage on January 31 and February 16, 1939. No other birds of this species were observed in the two winters.—WILLIAM H. MARSHALL, University of Minnesota, St. Paul, Minnesota, May 4, 1945.

Some Records of Birds in Utah.—Because of the paucity of records, it seems appropriate to report that C. M. Aldous and S. E. Aldous found a dead Starling (*Sturnus vulgaris*) at the Desert Range Experiment Station west of Milford, Beaver County, Utah, on September 1, 1942. These men observed no other birds of this species.

On June 2, 1943, C. S. Williams and G. H. Jensen observed a Least Bittern (*Ixobrychus exilis*) at the Bear River Migratory Bird Refuge, Box Elder County.

A Long-tailed Jaeger (*Stercorarius longicaudus*) was found dead on the H-line of Unit 2 of the Bear River Refuge on August 29, 1944, by C. C. Sperry. The bird had probably died of botulism. Dr. J. W. Aldrich examined the specimen critically and confirmed the identification.—CLARENCE COTTAM, *United States Fish and Wildlife Service, Chicago, Illinois, May 14, 1945.*

Evening Grosbeaks Feeding on Russian Olive Berries.—On March 21, 1945, at 5:00 p.m., I observed 23 Evening Grosbeaks (*Hesperiphona vespertina*) feeding on Russian olive berries in Taos, Taos County, New Mexico, at an elevation of approximately 7000 feet. These birds were observed again the next day at noon feeding in the same trees. On both occasions the grosbeaks were feeding with Robins. The feeding site was a row of nine Russian olive trees that were heavily loaded with fruit. After the birds were gone there were no berries left on any of the trees.

At the time of these observations a snow storm was in progress on the mountains around Taos, and on the night of March 21 some snow fell in Taos and the vicinity.—R. FRANK HEDGES, *Soil Conservation Service, Taos, New Mexico, May 30, 1945.*

Field Damage by Cedar Waxwings.—On April 25, 1945, the Agricultural Commissioner's office of Ventura County, California, was notified that large flocks of birds were eating Zinnia seeds that had just been planted and which had started to sprout. I was asked to go with the Deputy Commissioner to the locality where damage was occurring. The ranch, about six miles south of Saticoy, consists of open fields bordered by eucalyptus wind-breaks. These fields are planted to different kinds of vegetables and flowers that are to be harvested for seed. We drove up to one of the wind-breaks and a large flock of Cedar Waxwings (*Bombicilla cedrorum*) flew away. The ranch foreman said that these were the birds that were doing the damage and that they came to the fields just before sundown in flocks that must number at least a thousand birds. We examined the rows where the birds had been working and found that nearly every seed that had been planted in a field of three acres had been dug up, hulled and eaten. Only the seeds that were freshly sprouted and had not yet pushed through the ground were taken. After the plants were above the ground they were not touched, and the Zinnia seed was the only kind that was bothered.—SIDNEY B. PEYTON, *Fillmore, California, May 22, 1945.*

NOTES AND NEWS

Herbert Newby McCoy was born in Richmond, Indiana, June 29, 1870, and died in Los Angeles, California, May 7, 1945. He was the son of James Washington McCoy, a Civil War veteran, of old Presbyterian stock, and Sarah Newby, of a North Carolina Quaker family. The early death of his father left young Herbert, his mother and younger brother facing a hard struggle for existence. It is probable that the energy and self-reliance acquired through early economic necessity were potent factors in the brilliant success of his later career.

McCoy's first scientific interest was biology—particularly ornithology—and his intention was to study zoology under David Starr Jordan at

While working as a chemist for Swift and Company, and later as instructor at Fargo College, North Dakota, he prepared for further graduate work. In 1895 he went to the University of Chicago, and he received his Doctor's degree there in 1898. During the following years his outstanding work in scientific and commercial chemistry became well known in the chemical world and resulted in the publication of forty or more papers on organic amalgams, radio-activity and other specialized subjects. In 1937 he was the recipient of the Willard Gibbs Medal, the highest American honor for chemical research. More extended accounts of his life and accomplishments may be found in chemical publications (*Indust. and Engin. Chem.*, 13(13), 1935:280; *Chem. Bull.*, 24(5), 1937:171-174).

In 1922 McCoy married Dr. Ethel M. Terry, Associate Professor of Chemistry at the University of Chicago, with whom he had cooperated in writing a text-book on general chemistry, and who survives him.

My first acquaintance with Herbert McCoy came in July, 1928, when he called at my office and introduced himself as a retired chemist, recently moved from Chicago to Los Angeles, and interested in birds. He mentioned his acquaintance with various eastern ornithologists and told of trips made to Florida, Cuba, Puerto Rico, Panama and other regions, where he had studied the native bird-life. Impressed by his very pleasing personality and keen interest in birds, I was happy to submit his application for membership in the Cooper Club. Some time later, while McCoy's guest at a luncheon meeting of the American Chemical Society, I was impressed by the deference shown him by well-known visiting chemists, and I began to realize his standing in his profession.

As our friendship deepened, the McCoy's and the Willetts shared frequent camping trips to near-by desert and mountains. McCoy joined with enthusiasm in the collecting and studying of birds and mammals, and in the evening bridge games which often followed. In 1932, we were invited to accompany the McCoy's on a collecting trip to Guatemala. The ensuing expedition resulted in as pleasant an experience as any naturalist could wish for and in a fine collection of birds which was presented to the Los Angeles Museum. Our happy excursions together continued until the beginning of World War II and will remain among my most cherished recollections.

In the meantime, McCoy kept up his chemical research in a laboratory at his home, devoting much of his time to the study of rare earths



Fig. 32. Herbert N. McCoy, 1870-1945.

Indiana University. However, when Jordan moved to Stanford University, McCoy changed his plans and began the study of chemistry. By taking special examinations he was permitted to enter Purdue University as a sophomore in the autumn of 1889. He received his S.B. in 1892 and M.S. in 1893.

and their properties. Early in 1942 he was called back to the University of Chicago by the National Defense Research Committee to assist in the solution of problems important to the war effort. The success of his part in this project afforded him great satisfaction, but it is probable that the extended period of concentrated effort was detrimental to his health, as shortly after returning to California he suffered a stroke from which he never fully recovered.

Herbert McCoy's interest in the Cooper Ornithological Club was a sincere one. He did much for the organization and greatly valued his many friendships among its members. He served as President of the Southern Division in 1938 and was a member of the Board of Governors.

Modesty and generosity were among his most prominent characteristics. Many of the world's greatest scientists were his personal friends, but prominence had no part in his choice of friendships. He seldom referred to the merited recognition he had received in his profession. Much of his research was conducted without any desire for pecuniary profit, the results being at the disposal of any one whom he considered to be working for the advancement of science. He invariably welcomed an opportunity to be of service to his friends or to institutions and organizations in which he was interested, and he was always ready to give a helping hand to a deserving student.

Herbert McCoy loved birds. He never tired of watching them, and few things could delight him more than observing a species previously unknown to him. He will be sorely missed, not only by his human friends, but by his avian guests for whom he scattered daily food right up to the time of his final illness.—GEORGE WILLETT.

The paper stock used in publishing the *Condor* has again been reduced in weight in conformity with governmental regulations. This change took place in the May issue of this year.

An ornithological publication of distinct value which might easily be overlooked is the section on birds in "A Report upon the Biota of the Santa Ana Mountains" by Willis E. Pequegnat (*Jour. Ent. Zool. Pomona College*, 37, 1945:25-41). The avifauna of this group of mountains in southern California is compared with that of the near-by San Bernardino and San Jacinto mountains. One hundred and thirty-nine species are listed with notes on abundance, habitat, and seasonal movements.—A.H.M.

Your readers may be interested to know that satisfactory progress is being made in producing manuscript for future *Bulletins on the Life Histories of North American Birds*. The material

for four volumes, including all the birds on the A. O. U. Check-list from the jays to the vireos, has been in Washington for a long time, awaiting publication after the war. Two volumes on the wood warblers are now nearly completed, waiting for a few contributions from others. I am now starting work on the next volume, to include birds from the weaver finches to the tanagers, and am taking this opportunity to solicit contributions of notes on habits and photographs relating to birds in the three families, Ploceidae, Icteridae and Thraupidae. Previous contributions have been very helpful, and I hope they will continue.—A. C. BENT, Taunton, Mass.

PUBLICATIONS REVIEWED

"Modern Bird Study" (Cambridge, Harvard University Press, xii + 190 pp., \$2.50), by Ludlow Griscom of the Museum of Comparative Zoology at Harvard University, is addressed to the layman and to the amateur ornithologist. According to the preface, "this book is an outgrowth of a series of eight lectures given . . . in January, 1944. . . . The main object of the book . . . is to show that the study of birds is not only a branch of scientific research, . . . but that it also contains many topics of interest to the layman, and that the growing army of bird watchers have and can really assist the ornithologist in solving problem after problem by controlled, careful, and thorough observations."

The first five chapters are written for the layman with a general interest in birds; they deal with field ornithology, capacity (definable, apparently, as demonstration of free will or choice in conduct) and intelligence of birds, adaptability, and migration. No attempt is made to deal with the topics of bird-banding and life-history. These chapters, representing the contents of lectures, are written in a loose and informal narrative style. They contain much interesting information presented in simple, direct terms.

From the standpoint of the author's objective to present some notions of the science of ornithology to the layman, the treatment accorded these topics includes some puzzling items, as, for instance, his interpretation of adaptability and adaptation. At Wake Island, there was a flightless rail confined to two of three small, low islands; the rail did not spread to the third island even though it was connected to one of the other two by a bare flat exposed at low tide. This case is regarded (p. 46) as "possibly the world's record for no adaptability . . ." In the author's terms, is not the same true also of those Hawaiian honey-eaters (p. 49) which refuse to cross an open space occupied by a road that cuts an otherwise dense, dripping forest? What is more surprising is the author's example of a "truly remarkable and marvelous case of adaptability,"

one black-browed albatross, a species of the southern hemisphere, which lived in a gannet colony on the Faroe Islands during thirty-four consecutive summers, thousands of miles away from its normal range. When we read further (p. 46) that "many birds are extremely specialized and have no powers of adaptation whatever," it becomes clear that the implied interpretations do not agree with those generally held by biologists.

The last five chapters deal with distribution and classification. These "are more technical, and some knowledge of North American birds must be taken for granted." Here the author's wide experience as a naturalist, collector, and systematist forms the basis of an "attempt . . . to expound both the difficulties and fascinating problems of great biological importance in both disciplines," that is, distribution and classification. Again, I think it worth any interested layman's or amateur ornithologist's time to read these chapters. The four chapters on distribution are probably the best portion of the book.

The unnecessarily dismal outlook which the author takes on several avenues of ornithological research does not seem to me to help the case of the ornithologist, and the scientist, in the eyes of the layman. For instance, the "disappointingly different results" (p. 121) obtained by faunal studies of different groups of animals are not to be set aside because they are different, wherein, of course, some significance may be found. Nor does it seem to me to allay the prejudices of many amateur ornithologists toward systematics to dwell upon the "hopeless difficulties and insoluble problems" of classification without stating adequately the objectives of such studies on the part of biologists whose interests extend beyond "a graduated series of pigeon holes." The final chapter on classification contains several unwarrantedly strong statements. A number of ornithologists will disagree with Griscom's statement (p. 179) that "in all scientific works and articles the correct subspecific name must be given."

A six-page index and two dozen or so good text illustrations are provided.—FRANK A. PITELKA.

MINUTES OF COOPER CLUB MEETINGS

SOUTHERN DIVISION

APRIL.—The annual outdoor meeting of the Southern Division of the Cooper Ornithological Club was held on April 29, 1945, at Tapia Park in the Santa Monica Mountains, Los Angeles County, California, with 65 members and guests present. The formal business meeting was called to order at 2:00 p.m. by President Walter M. Bennett.

The following resolution was unanimously adopted:

The Southern Division of the Cooper Ornithological Club wishes to express its opposition to Assembly Bill No. 89, an act to add Section 29.1 to the State Fish and Game Code, directing the Division of Fish and Game to pay from the State Fund for the Preservation of Fish and Game, a bounty of 25¢ for each Crow turned over to the Division or its agents:

1. BECAUSE, history has proved that a bounty is not the answer to control;
2. BECAUSE, a bounty provides moral justification to shoot anything that moves;
3. BECAUSE, the State Fish and Game Code provides for destruction, under the supervision of the State Fish and Game Commission, of birds in defense of property damage;
4. BECAUSE, such control should be kept in the hands of a recognized authority; and
5. BECAUSE, although in some localities Crows undoubtedly do damage, in others they have proved valuable to agriculture by their destruction of tomato worms and other similar pests.

Adjourned.—DOROTHY E. GRONER, *Secretary*.

NORTHERN DIVISION

MAY.—The monthly meeting of the Northern Division of the Cooper Ornithological Club was held on Thursday, May 24, 1945, at 8:00 p.m., in Room 2503 Life Sciences Building, University of California, Berkeley, with President W. I. Follett in the chair and 75 members and guests present.

The following were proposed for membership: Roy Edgar Rodock, Lewiston State Normal School, Lewiston, Idaho, by Alden H. Miller; Bob Schuster, 3932 Ardley Ave., Oakland 2, California, by Brighton C. Cain; Howard Wayne Trimm, 165 Strong Avenue, Syracuse, New York, by Robert W. Storer; and Charles H. Yocom, 1011 Fountain Way, Berkeley, California, by Jean M. Linsdale.

Two short notes on trapping hawks and on clipping hawks' claws (pages 317, 332, Pacific Rural Press, May 12, 1945) were read and members were urged to write to the editor in protest against the control methods suggested.

Mrs. Grinnell reported a recent observation of a Cardinal by Mr. Genelly in his backyard in Oakland and stated that this was possibly an escaped cage bird. W. I. Follett reported a Lewis Woodpecker in his backyard in Oakland on May 5. Commander Hicks reported a Duck Hawk at Garberville on May 12.

Mr. and Mrs. H. D. Wheeler presented "Some Birds of the Coast Range in Color," after which the meeting was adjourned and members viewed an exhibit of bird photographs and paintings of birds and butterflies arranged by the Wheelers.

Adjourned.—ROBERT W. STORER, *Acting Secretary*.

For Sale, Exchange and Want Column.—Each Cooper Club member is entitled to one advertising notice in any issue of *The Condor* free. Notices of over ten lines will be charged for at the rate of 15 cents per line. For this department, address JOHN MCB. ROBERTSON, Buena Park, California.

WANTED—A copy of the 1931 edition of the A.O.U. Check-list, in good condition. Please write prices.—HENRY C. KYLLINGSTAD, *Mountain Village, Alaska*.

FOR SALE—As a lot, eighty-four copies of *American Aviculture*, as follows: 12 issues 1930, 11 of 1931, 9 of 1932, 3 of 1933, 2 of 1934, 5 of 1935, 5 of 1936, 5 of 1937, 6 of 1938, 6 of 1939, 4 of 1940, 2 of 1941, 6 of 1942, 6 of 1943, and 2 of 1944.—MILTON S. RAY, 405 Bernal Ave., *San Francisco 12, Calif.*

FOR SALE—*The Condor*; 1906-1944 (vols. 8-46 inclusive), 39 volumes not bound, \$60.00, carriage extra. Also: Bull. Cooper Ornith. Club; vol. I, Nos. 1, 3, 4 and 6; second and third indices to *Condor*, two ten-year periods, 1909-1928; Swarth's History Cooper Ornith. Club, 1929. Make offers on any of latter items.—WM. G. FARGO, 506 Union Street, *Jackson, Michigan*.

WANTED—A set of Dawson's *Birds of California*, deluxe, leather, original binding. Quote best cash price in first letter.—ERNEST S. BOOTH, *College Place, Washington*.

WANTED—To purchase complete set of *The Ibis*.—LEONARD WING, *State College of Washington, Pullman, Wash.*

PREPARATION OF MANUSCRIPTS FOR THE CONDOR

Articles published in the Condor normally are written by members of the Cooper Ornithological Club. Practically all the Club's money goes into the magazine; no editor and no business manager receive any pay other than the satisfaction of doing a service worthily. The preparation of good copy by the author will contribute greatly to accuracy of published output, dispatch in handling, and economy of production.

To be acceptable for inclusion in the Condor, articles must not duplicate in any substantial way material that is published elsewhere. Any type of subject bearing on birds may be considered; but the geographic areas of primary concern are western North America, Central America, and the Pacific Basin. Manuscripts may be submitted to any one of the editors (see inside front cover for address). Proofs with edited manuscripts will be sent to authors, at which time reprints may be ordered.

In the interests of accuracy and economy, observe the following: do not duplicate data in text, tables or charts; check citations to original sources and verify text references; quoted statements must be exact replicas of the original; preferably use vernacular names applicable to the entire avian species (for a guide in this regard, see "The Distribution of the Birds of California," *Pac. Coast Avif.* No. 27, 1944:5-34); in general, avoid subspecific vernaculars; insert scientific names for species but not the subspecific name except in taxonomic papers or where the race concerned has been critically determined by the author or his collaborators; revise the manuscript repeatedly to remove superfluous words and phrases, immaterial detail, and repetitious statements.

Note Condor style and usage. "General Articles" and the "Field and Study" items are set up in different form. Provide a concise, meaningful title, and, where needed, subtitles within the text. Footnotes are not used. The address line may serve to indicate institutional connection, and to it should be added the date of transmittal of the manuscript. Terminal bibliographies are desirable where five or more titles are to be cited; otherwise, the references may be included in the text. For bibliographic style, note closely the practices employed in recent volumes of the magazine. A factual summary is recommended for longer papers.

Rules for copy.—(1) typewrite material, using one side of paper only; (2) double space *all* material and leave liberal margins; (3) use $8\frac{1}{2} \times 11$ inch paper of standard weight (avoid onion skin); (4) carbon copies are not acceptable; (5) place tables on separate pages; (6) number pages in upper right hand corner.

Illustrations.—Photographs should be glossy prints of good contrast. Make line drawings with India ink; plan linework and lettering for at least $\frac{1}{2}$ reduction; do not use typewritten labels on the face of the drawing. Provide typed legends on separate sheets.

Helpful references on writing: *Manual of Style*, University of Chicago Press, and *Rules of the Editorial Committee*, University of California Press. On scientific nomenclature: A.O.U. Check-list (with supplements 19 and 20) and *Pacific Coast Avifauna* No. 27; authors are not required to follow either of these works.

THE EDITORS OF THE CONDOR.

July 26, 1945.

